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ABSTRACT

This study investigated the relationship between (1) achievement marks assigned by teachers to elementary grade, lower socio-economic status boys and girls, and (2) pupils' racial background, sex, intelligence quotient, and tested achievement. A pupil and a teacher sample were chosen from five Minneapolis inner-city schools. The pupil sample contained 62 American Indian, 46 Negro, and 143 white children. The teacher sample contained nine male and nine female white teachers. The children were classified by sex, race, grade IQ, tested achievement, and teacher assessment of achievement. A comprehensive statistical analysis was performed, including a three-way analysis of variance, and an analysis of covariance. Findings include the following. Girls obtain higher achievement scores than boys. When achievement scores are adjusted for IQ, the same sex differences occur. Differences in IQ scores do not exist between sexes. Differences in IQ scores exist between Indian, Negro, and white children, with the latter obtaining higher scores. Differences do not exist between boys and girls in achievement-group scores. These findings have important implications for curriculum design and the deficit theory. (JM)

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THE RELATIONSHIP OF TEACHERS' ASSIGNED MARKS TO TESTED ACHIEVEMENT AMONG EDUCATIONALLY AND CULTURALLY DISADVANTAGED CHILDREN IN THE ELEMENTARY GRADES

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September 5, 1969

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THE RELATIONSHIP OF TEACHERS' ASSIGNED MARKS TO TESTED ACHIEVEMENT AMONG EDUCATIONALLY AND CULTURALLY DISADVANTAGED CHILDREN IN THE ELEMENTARY GRADES

SUMMARY

Problem

The purpose of this study was to investigate the relationship of achievement marks assigned by teachers to elementary grade, lower socio-economic status boys and girls to pupils' (1) racial background, (2) sex, (3) intelligence quotient, and (4) tested achievement. Teacher marking procedures were studied. The rationale was to inquire whether or not characteristics of the teacher's classroom behavior were relevant factors in the child's success pattern in school.

Sample

A pupil sample of 251 subjects and a teacher sample of eighteen subjects were chosen from the 1967-68 fourth and sixth grade classes of five selected inner-city schools in Special School District Number 1, Minneapolis. The pupil sample consisted of 132 boys and 119 girls. The sample contained 62 American Indian, 46 Negro, and 143 white children. The teacher sample contained nine male and nine female white teachers.

Measuring instruments

The children were classified by sex, race, grade, IQ, tested achievement, and teacher assessment of achievement. Data collected on achievement were scores from the Iowa Tests of Basic Skills, and school report cards. Socio-economic status was ascertained by use of the Minnesota Scale for Paternal Occupations, a pupil questionnaire, and school records. A questionnaire was administered to the teachers to determine marking procedures.

Design

Descriptive statistics of both the teacher and the pupil samples were given. Two forms of a three-way analysis of variance, and an analysis of covariance, were used. Two factors, sex and race, were crossed, and the third factor, teacher assessment of achievement, was nested within the combination of the other two factors. Thirteen

hypotheses were tested in the four subject areas of reading, arithmetic, spelling, and language. The statistical analysis was performed with two sets of data, the fourth and sixth grades combined, and the sixth grade alone.

Results

Differences in achievement scores exist between boys and girls in reading, arithmetic, spelling, and language. Girls obtain higher scores than do boys.

When achievement scores are adjusted for IQ, the same sex differences occur.

Differences in achievement scores exist in teacher assessment of pupils marked satisfactory and in those marked unsatisfactory.

Differences in IQ scores do not exist between boys and girls.

Differences in IQ scores exist between pupils receiving satisfactory teacher marks and those receiving unsatisfactory teacher marks.

Differences in IQ scores exist between Indian, Negro, and white children. White children are found to obtain higher IQ scores than Indian and Negro children. These differences might result from the type of pupil sample.

Differences do not exist between boys and girls in achievement-group scores. The proportion of high and low achieving boys is similar to the proportion of high and low achieving girls.

Differences in achievement-group scores exist between children receiving satisfactory teacher marks and those receiving unsatisfactory teacher marks. Progressing from the fourth and sixth grade combination, to the sixth grade alone, there is less differentiation in teacher assessment of high and low achieving pupils.

Differences in achievement-group scores do not exist between Indian, Negro, and white pupils, with the one exception of teacher assessment of language skills.

Implications

Lower socio-economic boys and girls ought to be presented with adjusted curricular programs designed to allow both sexes to develop to their highest potential, especially in the area of language development.

The cumulative deficit theory of deteriorating academic progress through the grades is supported by this investigation.

With socio-economic level held constant, minority group children's achievement scores do not differ significantly from white children's scores.

Teacher marking habits are not consistent.

There is no evidence of teacher bias against lower-class minority races in this study.

CHAPTER I

INTRODUCTION

The Problem

To investigate the relationship of achievement marks assigned by teachers to elementary grade, lower socio-economic status boys and girls to pupils' (1) racial background, (2) sex, (3) intelligence quotient, and (4) tested achievement was the purpose of this study. Teacher attitudes and marking procedures were studied. The rationale behind this research study was to inquire whether or not characteristics of the teacher's classroom behavior were relevant factors in the child's success pattern in school.

The design of the study made it possible to test certain hypotheses about the effects of race, sex, I.Q., and tested achievement on assigned marks. Each hypothesis was tested in the four subject areas of reading, spelling, language, and arithmetic.

Significance of the Problem

There is mounting concern, today, for the educationally and economically disadvantaged child, and many more generalizations than specifics are being voiced about the deprived child (Corbin et al., 1965). It has been hinted that there is a great cultural and emotional divide and communication gap between middle-class teachers and lower-class pupils (Bernstein, 1960; Goldberg, 1964). It has been suggested by Dlabel et al. (1967) that teachers in general are prejudiced against lower socio-economic status children in their classrooms. The question is often asked, should teachers who work with minority group and disadvantaged children have characteristics that distinguish them from teachers who work effectively with children who live in advantaged areas? Should there prove to be differences in their attitudes, such a differentiation might be intimated.

Variables contributing to the disadvantaged child's poor school performance are reported to include such items as non-stimulating home environment, severe language deficit, lack of success-motivation, and the child's "unreadiness" for school (Loban, 1964; Taylor, 1965). His school achievement is characterized by a "cumulative-deficit" phenomenon (Cooper, 1964; Deutsch, 1965; Vosk, 1966; Jensen, 1969). The achievement pattern of disadvantaged children is such that they fall increasingly behind their non-deprived school peers in school subjects (Speasl et al., 1965). Another major area described in the current literature is the school's unreadiness for the disadvantaged child, including such factors as unsatisfactory materials, curricula, physical environment, teacher-education programs, and inappropriate teacher and administrative attitudes toward diverse racial groups (Wilson, 1963; Grotberg, 1965; Raph, 1965).

The problem of teacher attitude is not as yet well documented in the literature (Soar, 1965). Do teacher attitudes and values interfere with their pedagogical tasks (Bond et al., 1967)? Does the possibility exist that the teacher is prejudiced only against a certain race or color of children, and will this negative attitude be evident in the child's achievement pattern in school (Harding et al., 1954)?

Significant at this time is the deep concern over individual differences, and the battle that is fought to assure that each child receives the best possible education suited to his needs, talents, and learning style. Vast programs describing new methods and curricula, and innovative instructional procedures for "teaching the unteachable" (Bereiter et al., 1966; Kohl, 1967; Hodges and Spicker, 1967) are now being proposed, studied, produced, and evaluated. Teacher attitudes and marking practices are relevant to this evaluation.

Several relevant points emerge from a survey of the literature pertinent to cultural and ethnic differences in IQ and achievement in terms of standardized tests and teacher marks, as well as research related to lower-class status and achievement and the effect of teacher attitudes on achievement.

1. There is still powerful controversy about behavioral differences among human populations resulting from cultural rather than racial or genetic factors.

2. Research tends to generalize with respect to a population which is probably infinitely variable. There is most likely no "typical disadvantaged child," but instead a wide variety of such children with widely varying characteristics.

3. Ethnic group membership cannot provide an adequate guide to the understanding of individuals. Mean differences between groups are always far smaller than differences within groups.

4. Understanding cultural differences extends beyond any stereotyping of all minorities as if their values, behaviors, and even abilities are essentially alike. Research has found no acceptable evidence for the view that ethnic groups differ in innate abilities. Current research tends to stress the environmental determinants of differences between races.

5. Standardized tests currently in use present difficulties when they are used with disadvantaged minority groups. Serious questions have been raised concerning the validity of interpreting achievement test results for disadvantaged children when the standardization populations with which they are compared are so different in background, experience, and quality of education.

6. A consistent finding in research with disadvantaged children is the decline in academic aptitude and achievement scores of such children with time, demonstrating a cumulative deficit phenomenon.

7. The middle-class orientation of school personnel results in systematic discrimination against the children of the less privileged in the community, and shows a lack of understanding of varied cultural backgrounds.

8. Teachers' expectations contribute to differences in pupil attainment. Children will accommodate to the labels teachers paste on them. If the schools label them as nonacademic or early dropouts, teachers can end up with a self-fulfilling prophecy.

9. The "educational deprivation vs. the social deprivation" controversy continues. The former blames the massive academic retardation in depressed areas on the attitudes and behaviors of the school personnel; the latter attributes the underachievement to experiential deficits in early childhood, which fail to equip children to adapt well to school environment.

Limitations

There exist in this study, as there must in any study of this nature, certain limiting factors which the investigator was aware of and the reader must bear in mind when appraising the results and conclusions. The following limitations are noted:

1. The findings in this investigation are limited in the extent to which they can be generalized. The number of subjects in the sample was relatively small. Permission was granted to the investigator to visit schools in which were to be found a large number of Indian children. On examination, these schools did not have as many Negro children as Indian children in attendance. The investigator had hoped to study the attitudes of teachers teaching all three ethnic groups (Indian, Negro, and white), but had to abide by the limitation of a small number of schools in selected urban areas. The major limitation arising from the teacher sample is that it was not possible to randomly select the teachers from the total inner city school population. In order to identify as many Indian children as possible, it was necessary

to concentrate on a small number of selected schools. The Indian population of Minneapolis is not widespread throughout the city, but is located in two distinct pockets of the community.

2. There was the possibility of criterion contamination. It was assumed in this analysis that teacher marking with respect to grade level achievement is experimentally independent of the Iowa Basic Skills Test. There is the possibility that Iowa Basic Skills scores, or test scores highly correlated with Iowa Basic Skills scores, were available to the teacher prior to making out the evaluation of achievement levels. Obviously, if such scores were available, this condition would tend to vitiate the findings of the study. Research findings (Carter, 1952; Friedhoff, 1955; Ulibarri, 1960; Curry, 1962; Deutsch, 1964), however, relatively consistently show that teachers are very little influenced by knowledge of standardized test scores in their own personal marking practices.

There is a prevalence of fluctuating extremes in the academic expectations of teachers which leads to evaluative practices which are often inaccurate and incomplete. Feldhusen (1967) and Juliar (1968) conclude that for given levels of achievement in reading and arithmetic, teachers assign lower marks to disturbing children than to either normal or conforming pupils. Wilson (1963) states that it appears that teachers add extra weight to industry, effort, and cooperation, above and beyond their reflection in the quality of performance.

There is an absence of clear and accurate evaluations of achievement. Pettigrew (1968) concludes that such variables as race, social class, climate of the school, and racial composition of the school also affect teachers' marking practices. Research (Strom, 1966) on attitudes of teachers toward disadvantaged children generally shows more negative evaluations of these children than of middle-class children, with the achievement variable being held constant. Davidson et al. (1962), in a study of personality characteristics attributed to various occupational groups, concluded that the subjects, many of whom were prospective teachers, had decidedly unfavorable images of the factory worker. Such images were seen as destructive to the purposes of the school system. Arnold (1967) points out that teachers themselves do not feel that standardized test scores greatly influence assigned marks.

3. The reader might feel that there is here an implication that there is no difference in the relative deprivation in Negro and Indian and white children as long as they come from the same socioeconomic level. If there are differences in the relative deprivation of the groups, then the mean scores given by the teacher might simply reflect a difference in attitude toward the level of deprivation rather than a response to some other bias on her part. Is the white child whose father fits into the lowest category on the Minnesota Scale of Paternal

Occupations more or less deprived than the Indian child whose father has the same occupation and wages? To reply to this question is to respond to an intricate problem involving such factors as motivation, parental attitude, availability of materials, and previous experience. The investigator did not feel that she was implying "no differences" in deprivation. The same problem would occur in a narrower sense, for example, within an ethnic group. Is Negro child A, whose father is unemployed and on the Aid to Families with Dependent Children program, more or less deprived than Negro child B, whose father is unemployed and on AFDC? There are, assuredly, many degrees of deprivation, between two persons, two groups, or even, under some circumstances, two nations. The elusive definition of deprivation or disadvantaged would have to be agreed upon before any such discussion could be fruitful. Stodolsky and Lesser (1967) feel that the definition most widely used now is strictly based on gross environmental characteristics, and ignores the child's characteristics completely. More precise descriptions of children's learning patterns, which are intimately connected with instructional objectives and procedures, should also be included. With the understanding that the author is not implying "no differences" in the relative deprivation in various racial and ethnic groups, this study was directed toward teacher attitudes toward such groups.

4. Weaknesses in the measuring instruments in this study place a further restriction on the findings. The question of reliability and validity of instruments persists.

The rationale behind this study was to inquire whether characteristics of the teacher's classroom behavior are relevant factors in the child's success pattern in school. If teacher bias and teacher prejudice are operative against a certain race of children, and are evident in the child's achievement pattern in academic subjects, then widespread human-relations and teacher education programs would be indicated for the schools.

CHAPTER II

DESIGN OF THE STUDY

Descriptions of the populations and samples, the measures used, and the procedural techniques will be found in this chapter. A description of the methods used for analysis of the data, and the hypotheses of the investigation also are included.

Population and Selection of the Sample

This investigation was conducted in Special School District Number 1 which encompasses all the areas served by the Minneapolis Public Schools. There was in the school year 1967-1968, a total elementary school population of over 38,900 pupils. The non-white population was approximately 10 percent. The socio-economic level of the residents of the city of Minneapolis ranges from lower through upper class.

Two populations were involved in this study. One population consisted of fourth and sixth grade pupils who were enrolled in five inner-city schools in Special School District Number 1 during the academic year 1967-8. The data gathered at the end of the year reflected any behavioral changes which occurred during the first term of the year. The end of the second report card period coincided with the administration of achievement tests. Three hundred eighty-seven pupils were in this population.

The sampling unit for one of the populations, the pupil population, was the individual pupil. In lieu of a random sample of the entire Minneapolis elementary school population, the pupil sample was chosen from selected fourth and sixth grade classrooms. The restrictions of the research design limited the number of classrooms which could be used in the study. For purposes of the research the ethnic composition of all the classes had to be considered. Classroom populations were needed which included all three ethnic groups, Indian, Negro, and white.

The Consultant in Educational Research of the Minneapolis Public Schools helped to identify the schools with the highest percentage of Indian pupils in attendance. Of 26 Minneapolis elementary schools having Indian children in attendance in 1963, 22 schools had 10 percent or fewer Indian children. The five schools selected were Adams School, Blaine School (which has subsequently been closed), Greeley School, Hall School, and Madison School. The sample consisted of 251 children from 18 fourth and sixth grade classrooms. There were 132 boys and 119 girls.

A Minneapolis Public Schools Sight Count (1967) showed that 20 elementary schools were racially imbalanced. The criteria used were the Human Relations Guidelines of no more than 10 percent non-white students in secondary schools or 20 percent non-white in elementary schools, including Negro and Indian students. The number and percent of Negro and Indian students in the five schools used in this investigation are shown in Table I. "Other" non-white students such as children with Oriental or Mexican ethnic backgrounds are not included in this Table, as the number is inconsequential.

TABLE I

NUMBER AND PERCENT OF NON-WHITE STUDENTS WITHIN THE TOTAL ENROLLMENT OF FIVE SELECTED MINNEAPOLIS PUBLIC SCHOOLS IN 1967

School	Total Enrollment	Non-white Students Negro	Indian	Number
Adams	432	.14	.23	159
Blaine	247	.25	.12	91
Greeley	712	.06	.17	164
Hall	466	.14	.17	145
Madison*	220	.10	.08	40

*Madison School had over .10, but less than .20, Negro and Indian students, thus it was not considered racially imbalanced.

The second population consisted of all fourth and sixth grade teachers in five inner-city schools in Special School District Number 1 who held regular teaching certificates. Twenty-one teachers comprised this population. The sampling unit was the individual teacher. Teachers with split classes were not included in the study. From the pool of 21 teachers, 18 were selected, nine male teachers, and nine female teachers, five teaching fourth grade, and 13 teaching sixth grade. The criteria for selecting these teachers were that each of their classrooms had to contain Indian, Negro, and white children, that the classes not be split classes, and that the Iowa Tests had been administered to the children in their classrooms.

The Measures Used

Three measures were used on the student population: The Minnesota Scale for Paternal Occupations; The Iowa Tests of Basic Skills (reading, spelling, total language, and total arithmetic); and teacher-assigned marks for reading, spelling, language, and arithmetic. In order to determine marking practices, a questionnaire was administered to the teacher sample.

The Minnesota Scale for Paternal Occupations

The Minnesota Scale for Paternal Occupations is an instrument devised by the Institute of Child Development of the University of Minnesota (1950). It is used to give a general measure of children's socio-economic status according to their parents' occupations. The scale was originally designed to get an accurate characterization of the occupation directly from the mother and the father. It was stated that children report their parents' occupation inaccurately, or they do not know the actual occupation. However, the scale manual states that such reports can be verified against other available records to increase their accuracy. The manual also states that "studies (Anderson, 1936; Leahy, 1936) indicate that fairly good control of sampling can be had by using this scale."

The classification of occupations is divided into seven categories. Class I consists of professional occupations; Class II is semi-professional and managerial; Class III is clerical, skilled trades and retail business; Class IV is farmers; Class V is semi-skilled occupations, minor clerical positions, and minor business; Class VI is slightly skilled trades and other occupations requiring little training or ability; Class VII is day laborers of all classes.

The scale was designed to find a stratified sample of a whole population to secure stable measures of central tendency of a population. For the purposes of comparing differences between classes, samples are often drawn from a restricted population which results in too few cases in a category. One method used by some investigators to solve this problem is to group several occupational classes together, such as I-II, III-IV, and V-VII, thus permitting comparisons between combined classes. For the purposes of this study, classes V-VII were combined to comprise a lower socio-economic status sample.

Iowa Tests of Basic Skills

The Iowa Tests of Basic Skills provide for the measurement of achievement at the third- to ninth-grade levels of certain functional skills in reading, word-study, language, and arithmetic. The Manual for Administrators, Supervisors, and Counselors (Lindquist and Hieronymus, 1956) indicates that all commonly used principles in the validation of the test content were applied. Individual test items were critically selected from a large pool of items for their discriminating power by extensive preliminary testing.

Split-half reliability coefficients are high, and range from .84 to .96 for the major tests and from .70 to .93 for the subtests. The composite reliabilities for the whole test range from .97 to .98 for the different grades (Herrick, 1959).

Two types of norms are provided: grade norms and percentile norms within a grade. The population on which the norms were based was the total sample of all public school children in the United States, and included 74,174 pupils from 213 school systems in 46 states. The number of pupils of the fourth grade sample was 12,336, and the sixth grade was 11,911.

The sub-tests used in the present investigation were reading comprehension, spelling, total language, and total arithmetic. The reading comprehension sub-test was designed to measure such skills as recognizing important facts and details, the ability to organize ideas, and recognition of the writer's viewpoint. Seven to nine reading selections are included. The split-half reliability coefficient is .96 for fourth grade and .93 for sixth grade.

The items of the spelling sub-test consists of four words. The student must identify a misspelled word amongst distractors. The split-half reliability coefficient for both the fourth and sixth grades is .90.

The total language test covers the following skills: capitalization, punctuation, usage, and spelling as described above. The basic type of item used in all four of the language sub-tests is the "find-the-error" type. The split-half reliability coefficient for both the fourth and sixth grades is .95.

The arithmetic sub-test measures arithmetic concepts, problem solving, reasoning, and computation. The student is asked to choose the correct answer. The split-half reliability coefficient for both fourth and sixth grades is .90.

The reliability data presented above were obtained at the beginning of the school year. The authors indicate that preliminary data on mid-year and end-of-year testings were slightly higher.

Teacher Marks

A mark or a grade is a symbol of evaluation of a pupil by the teacher. Essential to sound evaluation is the accumulation of an extensive body of data which has been gathered by the classroom teacher from a variety of sources over an extended period of time. Report cards in the Minneapolis Public Schools offer information on two aspects of the child's school behavior. The child's achievement compared with the rest of his class is reported by means of a check-mark in one of three categories, above-, at-, or below-grade level. The child's achievement in relation to his own ability or potential is indicated by S (Satisfactory) or N (Not satisfactory), next to subject matter areas, such as reading or language (see Appendix A). This study is concerned with the latter, the marking of academic subjects.

A questionnaire (see Appendix B) was administered to ascertain what teachers considered as the most important factors influencing them before assigning their marks. The questionnaire was designed by Arnold (1966) to see which criteria teachers perceived as influencing their marking habits. Each of the four major categories, work habits, adjustment with others, behavior traits, and achievement, were studied. Eighteen teachers responded.

Table II shows the means and standard deviations of the fourth and sixth grade teachers' responses to the questionnaire items. It is evident from the responses that the teachers, on the average, considered achievement to be the most important factor in determining grades (41.2%). Children's work habits, which could be considered related to achievement, ranked second in importance (26.3%). Adjustment with others (16.3%) and behavior traits (16.2%) were considered by the teachers, on the average, to be of some considerable importance. Fourth and sixth grade teachers seemed to be in general agreement although it appeared that the fourth grade teachers were slightly more influenced by achievement, and less influenced by the children's personality and behavior than the sixth grade teachers.

Of the sub-factors grouped under work habits, participation in class and use of study time appeared to be the two major factors influencing marks. Under achievement, the major sub-factors influencing marks were said to be class assignments, scores on teacher-made tests, and home assignments. Teachers did not feel that standardized achievement tests were as influential as the other sub-factors, which related more to study skills and habits.

TABLE II

MEAN PERCENTAGES AND STANDARD DEVIATIONS OF TEACHER RESPONSES TO QUESTIONNAIRE ON FACTORS INFLUENCING MARKS

	4th Grade N = 5		6th Grade N = 13		4th & 6th Grade N = 18	
Factors	$\bar{X}$	sd	$\bar{X}$	sd	$\bar{X}$	sd
Work Habits	27.1	9.6	25.4	13.6	26.3	9.8
Participation in Class	7.2	4.3	9.2	8.7	8.3	6.5
Use of Study Time	10.5	6.7	6.3	4.2	8.8	5.5
Accuracy	4.7	1.9	7.3	1.7	6.1	1.8
Neatness	4.7	3.6	2.6	6.6	3.1	5.1
Other	0.0	0.0	0.0	0.0	0.0	0.0
Adjustment with Others	14.6	6.4	18.3	7.8	16.3	7.1
Cooperates	6.8	2.9	6.1	3.4	6.3	2.2
Displays Leadership	1.8	1.7	3.9	3.4	2.8	2.9
Thoughtfulness	1.6	3.0	3.1	4.2	2.3	3.1
Respects Authority	3.0	3.8	3.8	3.6	3.5	3.7
Other	1.4	3.0	1.4	3.1	1.4	3.0
Behavior Traits	15.0	7.5	17.2	4.1	16.2	5.8
Dependability	4.3	3.4	6.6	3.0	5.5	3.2
Initiative	5.9	4.2	3.6	2.3	4.7	3.3
Courtesy	1.9	2.1	2.7	3.4	2.4	2.6
Distractability	2.9	4.2	4.3	5.2	3.6	4.7
Other	0.0	0.0	0.0	0.0	0.0	0.0
Achievement	43.3	16.0	39.1	16.5	41.2	16.3
Scores on Teacher-made Tests	10.6	7.6	9.4	9.4	9.9	8.4
Standardized Ach. Test Scores	8.0	12.4	7.4	3.5	7.7	7.9
Class Assignments	13.8	7.8	4.1	3.4	8.1	5.6
Home Assignments	8.1	5.4	15.0	8.0	12.5	5.6
Other	2.8	6.7	3.2	6.5	3.0	6.6

The Procedure

After the classrooms were identified, and the teacher sample, consisting of nine men and nine women, and the pupil sample, consisting of 132 boys and 119 girls, taught by the above teachers, were selected, the data were collected.

The data for the pertinent variables of sex, chronological age, grade, race, occupation of parent, intelligence quotient scores, achievement scores, and teacher marks were gathered. The hypotheses to be tested were written in general form prior to collecting the data. The hypotheses could be tested only after the data were examined to determine cutting points for achievement. Descriptive data were obtained by use of both double-checked hand-scoring and computer-assisted procedures.

Based on achievement test scores the high achievement group was the 50 percent of the sample falling above the median score, and the low achievement group was the 50 percent of the sample falling below the median score of the four achievement variables, reading, arithmetic, spelling, and language. The scale devised was: _1_ indicating an above the median score and _0_ indicating a below the median score.

Data such as age, sex, achievement test scores reported in grade equivalents and based on national norms, and IQ scores were gathered from the cumulative folders for each child in the sample. Marks were gathered from report cards kept by teachers in their classrooms. It was necessary to convert the _S_ (Satisfactory) and the _N_ (Not satisfactory) marks into numerical values for computational purposes. The scale devised was: _1_ indicating Satisfactory, and _2_ indicating Not satisfactory.

Data on socio-economic level were obtained from a questionnaire given to the children by their teachers during class time, and from cumulative records. The questionnaire was entitled "Family Information Sheet" (see Appendix C) and contained, among nine distractors, four items which called for naming the person in the family who had a job, and describing the occupation. The children's cumulative records verified this information, and teachers added further substantiation. Agreement for the three sources of occupational data appeared high.

The "Family Information Sheet" also contained an item teachers were requested to fill out. They were asked to perform a sight count of their classrooms and to circle _I_, _N_, or _W_, to indicate whether the child was Indian, Negro, or white. School records do not contain this information.

Data on age, sex, amount of college training, and years of teaching experience for the teacher sample came from a questionnaire completed by the teachers.

The Teacher Sample

The teacher sample consisted of 18 white teachers, nine men and nine women. As can be seen in Table III, the mean age of the fourth grade teachers (25.0) was lower than the mean age of the sixth grade teachers (36.3). The mean age of all the teachers was 33.2 years. The age range of the fourth grade teachers (20-39) was more restricted than that of the sixth grade teachers (25-49). Three sixth grade teachers were over 45, while the maximum age of the fourth grade teachers was 39.

TABLE III

FREQUENCY DISTRIBUTION AND SUMMARY DESCRIPTION OF AGE OF THE TEACHER SAMPLE GROUPED BY GRADE

Age	4th Grade	6th Grade	Total
45-49	0	0	0
35-39	1	4	5
30-34	0	4	4
25-29	2	2	4
20-24	2	0	2
N	5	13	18
Mean	25.0	36.3	33.2
sd	5.9	6.5	6.2

Table IV shows the amount of college training of the teachers. As can be seen, all the teachers in the sample had the minimum of a Bachelor's degree. Three teachers had a Bachelor's degree plus 1-10 credits; eight teachers had a Bachelor's degree plus 11-20 or more credits; one teacher had a Master's degree; and one teacher had a Master's degree plus 11-20 or more credits.

Table V gives a description of the amount of teaching experience of the teacher sample. On the average, the sixth grade teachers had

TABLE IV

FREQUENCY DISTRIBUTION AND SUMMARY DESCRIPTION OF YEARS OF COLLEGE TRAINING OF THE TEACHER SAMPLE

Training	4th Grade	6th Grade	Total
BA Degree	2	3	5
BA Degree plus 1-10 Credits	1	2	3
BA Degree plus 20 or more Credits	2	6	8
MA Degree	0	1	1
MA Degree plus 11-20 or more Credits	0	1	1
TOTAL	5	13	18

TABLE V

FREQUENCY DISTRIBUTION AND SUMMARY DESCRIPTION OF TEACHING EXPERIENCE OF THE TEACHER SAMPLE

Years	4th Grade	6th Grade	Total
16-19	0	3	3
12-15	0	2	2
8-11	0	6	6
4-7	2	1	3
0-3	3	1	4
TOTAL	5	13	18
Mean	5.1	11.0	9.3
sd	2.2	4.8	3.9

approximately six and a half more years of teaching experience (11.8) than the fourth grade teachers (5.1), which probably can be accounted for by the age differential of the men over the women. Three sixth grade teachers had between 16 and 19 years of experience whereas none of the fourth grade teachers had taught for more than 4-7 years. The fourth grade teachers, then, were younger and had had less teaching experience than the sixth grade teachers.

The Pupil Sample

The total number of children in the sample was 251, of whom 71 were fourth graders and 180 were sixth graders. There were 62 Indian, 46 Negro, and 143 white children. There were 34 Indian boys, 28 Indian girls, 28 Negro boys, 18 Negro girls, 70 white boys, and 73 white girls. The proportion of the Indian sample to the total pupil sample was .25, of the Negro, .18, and of the white, .57. The total sample consisted of 132 lower socio-economic boys and 119 lower socio-economic girls. Table VI illustrates the above figures.

Table VII shows the distribution of the children in the sample arranged by classroom teacher, grade, race, and sex. The pupil sample was selected from 18 classrooms. Each classroom contained Indian, Negro, and white children. The smallest number of children selected from a classroom was 11, the largest number was 17.

The socio-economic level of the children in this sample was classified according to the Minnesota Scale for Paternal Occupations. The distribution of the sample is presented in Table VIII. Because the purpose of this investigation was to study a group of lower SES children, pupils in the upper part of the classification (Classes I-IV) were not selected to be part of the sample. Classes I, II, and III were considered to be middle-class and upper-class ratings. Class IV, farmers, was not represented in this pupil sample. Thus, only Classes V-VII occupational level children were included. Typical of the type of occupations listed for the breadwinners of the families were cook, janitor, baby-sitter, dishwasher, truck driver, cement worker, warehouseman, highway maintenance man, unemployed, and ADC. The sample contained 74 children (.29) in Class V, 83 children (.34) in Class VI, and 94 children (.37) in Class VII. The Indian and Negro samples appear to be evenly distributed over all three occupational classes, while the white sample is slightly larger in Class V, and smaller in Classes VI and VII than the other two racial groups.

TABLE VI

FREQUENCY DISTRIBUTION OF PUPIL SAMPLE GROUPED ACCORDING TO RACE, GRADE, AND SEX

Grade	Sex	Indian	Negro	White	Total 4th	Total 6th	Total Boys	Total Girls
4	Boy	11	13	13	37		37	
4	Girl	8	9	17	34			34
6	Boy	23	15	57		95	95	
6	Girl	20	9	56		85		85
TOTAL		62	46	143	71	180	132	119
% of Total Sample		.25	.18	.57				
N = 251								

TABLE VII

DISTRIBUTION OF CHILDREN IN SAMPLE ARRANGED BY CLASSROOM TEACHER, GRADE, RACE, AND SEX

Teacher No.	Grade	Indian		Negro		White		TOTAL
		B	G	B	G	B	G	
03	4	5	0	2	1	2	4	14
12	4	1	2	2	3	4	3	15
13	4	2	1	3	2	2	2	12
14	4	3	2	2	2	3	5	17
15	4	1	2	4	1	2	3	13
01	6	3	1	1	1	4	5	15
02	6	2	2	1	0	2	7	14
04	6	1	0	1	1	5	5	13
05	6	3	1	0	2	5	1	12
06	6	2	2	1	2	3	4	14
07	6	2	2	1	0	4	5	14
08	6	3	2	1	0	3	7	16
09	6	1	1	0	1	5	5	13
10	6	1	2	3	0	6	4	16
11	6	2	3	1	0	5	4	15
16	6	1	2	1	0	6	1	11
17	6	1	0	2	1	4	5	13
18	6	1	2	2	1	5	3	14
							N	251

TABLE VIII

DISTRIBUTION OF CHILDREN GROUPED ACCORDING TO RACE AND POSITION ON THE MINNESOTA SCALE FOR PATERNAL OCCUPATIONS

Class	Type of Occupation	Indian N	Indian %	Negro N	Negro %	White N	White %	TOTAL N	TOTAL %
I	Professional	0	0	0	0	0	0	0	0
II	Semi-professional and Managerial	0	0	0	0	0	0	0	0
III	Clerical, Skilled, Trades & Retail Business	0	0	0	0	0	0	0	0
IV	Farmers	0	0	0	0	0	0	0	0
V	Semi-skilled Occupations, Minor Clerical positions, & Minor Business	17	27	12	26	45	31	74	29
VI	Slightly Skilled Trades & Other Occupations Requiring Little Training or Ability	21	34	16	35	46	32	83	34
VII	Day Laborers of All Classes	24	39	18	39	52	37	94	37
	TOTALS	62	100	46	100	143	100	251	100

Table IX represents a distribution of the children's parents who were separated, divorced, deceased, disabled, or unemployed. The parents are grouped by race and position on the Minnesota Scale for Paternal Occupations. The Negro sample appeared to be suffering from more of these problems (.62) than the white (.50) or the Indian (.43) samples. Approximately .51 of the total group of parents had some visible social or economic problems. Sixty-three children, or .21 of the total sample were members of broken families, and 48 children, or .19 of the total sample, had mothers or fathers who were unemployed.

TABLE IX

FREQUENCY DISTRIBUTION OF CHILDREN'S PARENTS SEPARATED, DIVORCED, DECEASED, DISABLED, OR UNEMPLOYED GROUPED BY RACE AND POSITION ON THE MINNESOTA SCALE FOR PATERNAL OCCUPATIONS

Race	SES Class	Separated	Divorced	Deceased	Disabled	Unemployed	Total
Indian	V					1	1
N = 62	VI	1	3				4
	VII	8		1	1	11	22
%		.15	.06	.01	.01	.20	.43
Negro	V		1			1	2
N = 46	VI	3	4	2		1	10
	VII	3	2	2		10	17
%		.13	.15	.08		.26	.62
White	V	3	4			1	8
N = 143	VI	7	7	7	2	4	20
	VII	7	10	7	1	19	44
%		.12	.15	.06	.01	.16	.50

Table X shows the distribution of the average number of children per family, grouped by race and position on the Minnesota Scale for Paternal Occupations. The average number of children per family, and per occupational class was 5.3 children. The Indian sample had a slightly greater number of children (5.6) than the Negro (5.2) and white (5.0) sample per family. Class V families (5.6) had a slightly greater number of children than Class VI families (5.1) and Class VII families (5.2).

TABLE X

FREQUENCY DISTRIBUTION OF THE NUMBER OF CHILDREN PER FAMILY GROUPED BY RACE AND POSITION ON THE MINNESOTA SCALE FOR PATERNAL OCCUPATIONS

Race	N	SES Class	Children in Family N	$\bar{X}$
Indian	17	V	107	6.3
Negro	12	V	64	5.3
White	45	V	233	5.1
TOTAL	74	V	404	5.6
Indian	21	VI	113	5.4
Negro	16	VI	81	5.1
White	46	VI	228	4.9
TOTAL	83	VI	422	5.1
Indian	24	VII	127	5.3
Negro	18	VII	98	5.4
White	52	VII	256	4.9
TOTAL	94	VII	481	5.2
Indian	62	V-VII	347	5.6
Negro	46	V-VII	243	5.2
White	143	V-VII	717	5.0
TOTAL	251	V-VII	1307	5.3

The chronological age of the children is shown in Table XI. Age was calculated as of March 15, 1968. The mean chronological age of the fourth grade children was 117.74 months, and for the sixth grade children was 141.75. As can be seen in the table, the mean chronological age of the various sub-groups remained quite close to the means for each grade, with the exception of the fourth grade Indian boys who appear to be about six months older than the Negro and white fourth grade boys. The average Indian child (136.61) and the average white child (136.90) were approximately 6 months older than the average Negro child (130.13). The girls were generally younger than the boys.

TABLE XI

CHRONOLOGICAL AGE OF PUPIL SAMPLE

Grade	Child's Sex	RACE							
		Indian		Negro		White		Total	
		N	$\bar{X}$ CA	N	$\bar{X}$ CA	N	$\bar{X}$ CA	N	$\bar{X}$ CA
4th	Boy	11	125.66	13	117.33	13	118.33	37	120.16
4th	Girl	8	117.00	9	120.55	17	120.05	34	116.82
6th	Boy	23	144.25	15	142.46	57	142.19	95	142.73
6th	Girl	20	141.70	9	137.66	56	140.96	85	140.78
TOTAL	-Months	62	136.61	46	130.13	143	136.90	251	135.01
	Years		11.38		10.84		11.41		11.25
TOTAL - $\bar{X}$ CA		4th Grade:			117.74 Months 9.81 Years				
		6th Grade:			141.25 Months 11.75 Years				

The typical child in the pupil sample had been administered a Lorge-Thorndike Intelligence Test. Intelligence quotient scores were recorded in each child's cumulative folder. Lorge-Thorndike (1957) intelligence quotients may be interpreted within the following framework: about .68 of all IQ scores will fall between IQ's of 84 and 116; about .14 will fall between IQ scores of 68 and 84; and about .14 between 116 and 132; only .02 will fall below 68 or above 132.

A few of the children had attended school elsewhere, and Stanford-Binet Intelligence Test scores, or Kuhlmann-Anderson Intelligence Test scores were available for these children. Those scores were included in Table XII which gives the details of the intelligence quotients of the pupil sample grouped by grade, sex, and race. The mean intelligence quotient of fourth grade children was 89.10 and the mean intelligence quotient of sixth grade children was 82.91. This indicates a substantial difference in IQ from 4th to 6th grade. Girls in the fourth grade (92.27) scores higher than the rest of the sample. Negro girls in the sixth grade and Indian boys in the sixth grade scored the lowest of the sample. All boys and all girls in all three racial groups dropped in intelligence quotient scores going from fourth to sixth grade. On the average, the white students appeared to score higher than the Indian or Negro students in the fourth grade, yet had the same IQ scores as the Indian students in the sixth grade. The girls appeared to have higher scores than the boys.

Table XIII shows the distribution of intelligence quotient scores of boys and girls grouped by grade, race, and position on the Minnesota Scale for Paternal Occupations. There appears to be a slight downward trend for the total sample as the socio-economic class goes down. The fourth grade Negro and white samples show the most substantial change in IQ proceeding from Class V to Class VII.

Tables XIV through XVII show the mean achievement Iowa Test Scores of fourth and sixth grade children grouped by sex, race, and teacher marks (Satisfactory and Not Satisfactory), over the four variables, reading, arithmetic, spelling, and language. The mean grade equivalents for all races and both sexes appear to be well below the average grade equivalent that might be expected. All subjects are below grade level, with spelling scores the lowest and language scores the highest. The Negro sample appeared to score lowest in all academic areas with the exception of the fourth grade Negro boys who scored higher than the rest of the Negro sample. The Indian and white samples' scores appear to be very much alike at both grade levels. These tables also indicate that the girls achieved higher than did the boys. The mean achievement test scores for the entire sixth grade show one grade level or less improvement over the fourth grade scores.

Tables XVIII through XXI show the mean achievement-group scores of high and low achieving pupils grouped according to sex, race, grade, and teacher marks, over the four variables, reading, arithmetic, spelling, and language. Pupils with Iowa Test scores over the grade median received a one, and pupils with scores under the grade median received a zero.

TABLE XII

MEAN INTELLIGENCE QUOTIENT SCORES OF BOYS AND GIRLS GROUPED BY SEX, RACE AND GRADE

Grade		Indian	Negro	White	Total
		Boys			
4th	$\bar{X}$	83.45	84.61	94.62	88.58
	sd	9.01	11.66	11.27	10.65
	N	11	13	13	37
6th	$\bar{X}$	76.39	80.60	83.50	81.31
	sd	11.67	12.11	11.90	11.89
	N	23	15	57	95
Total	$\bar{X}$	78.64	82.46	85.93	83.35
	sd	10.30	11.90	11.60	11.27
	N	34	28	70	132
		Girls			
4th	$\bar{X}$	96.25	87.78	92.78	92.27
	sd	10.70	13.22	13.90	11.60
	N	8	9	17	34
6th	$\bar{X}$	84.04	77.86	86.03	84.70
	sd	9.04	12.49	9.93	10.45
	N	20	9	56	85
Total	$\bar{X}$	87.50	82.82	87.60	86.86
	sd	9.85	12.92	10.91	11.23
	N	28	18	73	119
		Boys and Girls			
Total	$\bar{X}$	82.64	82.71	86.78	85.05
	sd	10.10	12.66	11.79	11.24
	N	62	46	143	251

TABLE XIII

DISTRIBUTION OF INTELLIGENCE QUOTIENT SCORES OF BOYS AND GIRLS GROUPED BY GRADE, RACE, AND POSITION ON THE MINNESOTA SCALE FOR PATERNAL OCCUPATIONS

SES Class		Indian	Negro	White	Total	Indian	Negro	White	Total	Indian	Negro	White	4th and 6th Total
	$\bar{X}$	87.60	90.20	99.00	92.14	80.25	81.68	86.44	84.53	83.92	85.99	92.72	87.87
V	sd	7.64	7.46	12.25	11.52	7.25	11.02	10.19	10.02	7.45	9.24	11.22	9.30
	N	5	5	10	20	12	6	36	54	17	11	46	74
	$\bar{X}$	90.43	90.00	91.69	90.77	82.50	78.77	84.84	83.03	86.47	84.30	87.36	86.90
VI	sd	11.83	10.42	12.00	11.57	14.89	7.65	12.69	12.49	13.36	9.04	12.34	11.58
	N	7	5	13	25	14	13	31	58	21	18	44	83
	$\bar{X}$	89.14	82.42	90.00	87.04	78.06	73.00	85.93	82.91	83.60	77.71	87.97	83.09
VII	sd	13.11	13.83	13.30	13.74	10.07	21.89	10.84	12.15	11.59	17.86	12.07	13.51
	N	7	12	7	26	17	6	45	68	24	18	52	94

TABLE XIV

MEAN READING ACHIEVEMENT SCORES IN GRADE EQUIVALENTS GROUPED ACCORDING TO SEX, RACE, GRADE, AND TEACHER MARKS

		Boys				Girls				Boys and Girls			
		Indian	Negro	White	Total	Indian	Negro	White	Total	Indian	Negro	White	Total
4th Grade													
	$\overline{X}$	2.8	2.7	2.4	2.5	2.6	2.4	2.8	2.6	2.6	2.6	2.5	2.6
S	sd	0	1.4	2.0	1.6	1.2	1.0	0.7	1.0	1.1	1.2	1.5	1.2
	N	1	4	6	11	7	3	5	15	8	7	11	26
	$\overline{X}$	1.3	2.2	1.7	1.4	4.6	1.7	2.1	.21	1.6	2.0	1.9	1.9
N	sd	0.8	0.8	0.4	0.9	0	0.6	0.5	0.05	1.2	0.8	0.5	0.8
	N	10	9	7	26	1	6	12	19	11	15	19	45
	$\overline{X}$	1.4	2.4	2.0	1.9	3.6	1.9	2.3	2.3	2.0	2.2	2.1	2.1
To-tal	sd	0.9	1.0	1.8	1.1	0.8	0.8	0.6	0.7	1.3	0.9	1.0	1.0
	N	11	13	13	37	8	9	17	34	19	22	30	71
6th Grade													
	$\overline{X}$	2.4	2.1	2.9	2.4	3.1	3.5	3.5	3.3	2.9	2.8	3.2	3.1
S	sd	0.1	0.7	1.2	.06	1.5	1.8	1.2	1.5	1.2	1.4	1.2	1.2
	N	8	3	23	34	11	3	35	49	19	6	58	83
	$\overline{X}$	2.0	2.0	2.3	2.1	2.7	2.2	2.1	2.4	2.3	2.1	2.2	2.2
N	sd	0.9	0.7	1.1	.08	1.4	1.0	0.9	1.1	1.1	0.8	1.1	1.0
	N	15	12	34	61	9	6	21	36	24	18	55	97
	$\overline{X}$	2.1	2.0	2.5	2.3	2.9	2.6	2.9	2.8	25	2.2	2.7	2.5
To-tal	sd	0.9	.7	1.9	0.7	1.4	1.3	1.2	1.3	1.1	1.0	1.6	1.2
	N	23	15	57	95	20	9	56	85	43	24	113	180

TABLE XV

MEAN ARITHMETIC ACHIEVEMENT SCORES IN GRADE EQUIVALENTS GROUPED ACCORDING TO SEX, RACE, GRADE, AND TEACHER MARKS

		Boys				Girls				Boys and Girls			
		Indian	Negro	White	Total	Indian	Negro	White	Total	Indian	Negro	White	Total
4th Grade													
S	$\overline{X}$	1.3	1.9	2.2	1.9	2.4	2.5	2.4	2.4	1.9	2.1	2.3	2.2
	sd	0.9	0.4	1.1	0.9	1.0	0.7	1.0	0.9	1.0	0.5	1.0	0.9
	N	3	6	8	17	3	3	10	16	6	9	18	33
N	$\overline{X}$	2.0	1.6	2.1	1.9	2.3	2.1	1.5	1.9	2.1	1.8	1.8	1.9
	sd	1.0	0.6	1.1	1.0	1.2	0.4	0.8	0.9	1.0	0.6	0.8	0.9
	N	8	7	5	20	5	6	7	18	13	13	12	38
S & N	$\overline{X}$	1.8	1.7	2.2	1.9	2.4	2.2	2.0	2.1	2.0	1.9	2.1	1.9
	sd	0.9	0.5	1.1	1.0	1.1	0.6	1.0	0.9	1.0	0.6	1.0	0.9
	N	11	13	13	37	8	9	17	34	19	22	30	71
6th Grade													
S	$\overline{X}$	2.4	2.1	2.5	2.3	2.8	2.1	2.8	2.5	2.6	2.1	2.7	2.7
	sd	0.5	0.5	1.0	0.9	0.3	0.6	0.8	0.6	0.5	0.5	0.9	0.8
	N	6	4	24	34	7	4	31	42	13	8	54	75
N	$\overline{X}$	1.9	2.0	2.0	1.9	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0
	sd	0.6	0.3	0.7	0.6	0.9	0.5	0.8	0.8	0.8	0.3	0.7	0.6
	N	17	11	33	61	13	5	25	43	30	16	59	105
Total	$\overline{X}$	2.0	2.[illegible]	2.2	2.1	2.4	2.1	2.5	2.4	2.3	2.1	2.4	2.2
	sd	0.6	0.3	0.9	0.6	0.6	0.6	0.9	0.6	0.6	0.4	0.9	0.6
	N	23	15	57	95	20	9	56	85	43	24	113	180

TABLE XVI

MEAN SPELLING ACHIEVEMENT SCORES IN GRADE EQUIVALENTS GROUPED ACCORDING TO SEX, RACE, GRADE, AND TEACHER MARKS

		Boys				Girls				Boys and Girls			
		Indian	Negro	White	Total	Indian	Negro	White	Total	Indian	Negro	White	Total
4th Grade													
	$\overline{X}$	0.9	1.6	1.2	1.2	1.4	1.5	1.6	1.5	1.1	1.6	1.4	1.3
S	sd	0.8	0.3	0.7	0.7	0.8	1.1	0.9	0.9	0.8	0.8	0.8	0.8
	N	7	6	9	22	7	5	7	19	14	11	16	41
	$\overline{X}$	0.6	0.7	1.3	.08	2.4	0.8	0.7	.08	0.9	0.7	1.0	0.8
N	sd	0.4	0.2	0.5	.04	0	0.2	0.2	0.2	0.9	0.2	0.4	0.3
	N	4	7	4	15	1	4	10	15	5	11	14	30
	$\overline{X}$	0.7	1.2	1.2	1.1	1.5	1.1	1.0	1.2	1.1	1.2	1.1	1.1
Total	sd	0.7	0.6	0.6	0.6	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.7
	N	11	13	13	37	8	9	17	34	19	22	30	71
6th Grade													
	$\overline{X}$	1.8	1.8	1.7	1.7	2.2	2.1	2.7	2.1	2.1	2.0	1.9	2.0
S	sd	1.1	1.3	1.2	1.2	1.0	1.0	0.7	1.0	1.0	11	1.1	1.1
	N	9	5	33	47	15	7	42	64	24	12	72	109
	$\overline{X}$	1.0	0.9	1.1	1.0	1.7	1.5	1.4	1.5	1.2	1.0	1.2	1.1
N	sd	0.8	0.3	0.7	0.7	0.8	1.3	0.6	0.5	0.7	0.5	0.6	0.6
	N	14	10	24	48	5	2	14	21	19	12	40	71
	$\overline{X}$	1.3	1.3	1.4	1.4	2.1	2.0	2.0	2.0	1.7	1.5	1.7	1.7
Total	sd	0.9	0.9	1.1	1.0	0.9	1.0	0.9	0.8	0.9	1.0	1.0	1.0
	N	23	15	57	95	20	9	56	85	43	24	113	180

TABLE XVII

MEAN LANGUAGE ACHIEVEMENT SCORES IN GRADE EQUIVALENTS GROUPED ACCORDING TO SEX, RACE, GRADE, AND TEACHER MARKS

		Boys				Girls				Boys and Girls			
		Indian	Negro	White	Total	Indian	Negro	White	Total	Indian	Negro	White	Total
4th Grade													
	$\bar{X}$		4.6	4.5	4.5	5.5	5.5	4.2	5.1	5.5	4.9	4.3	4.7
S	sd	0	1.0	1.9	1.6	1.5	2.2	1.2	1.5	1.5	1.6	1.5	1.5
	N	0	5	7	12	6	3	10	19	6	8	17	31
	$\bar{X}$	2.5	4.4	3.3	3.5	3.9	3.4	4.1	3.7	2.7	3.9	3.7	3.5
N	sd	1.5	1.0	1.2	1.4	1.1	0.8	2.0	1.6	1.5	1.0	1.6	1.5
	N	11	8	6	25	2	6	7	15	13	14	13	40
	$\bar{X}$	2.5	4.0	3.9	3.7	5.1	4.1	4.1	4.4	3.7	4.3	4.0	4.0
Total	sd	1.5	1.0	1.5	1.4	1.5	1.6	1.5	1.5	20	1.3	1.5	1.5
	N	11	13	13	37	8	9	17	34	19	22	30	71
6th Grade													
	$\bar{X}$	6.7	3.5	5.6	5.2	7.6	5.6	7.2	6.8	7.3	4.2	6.6	6.0
S	sd	2.6	0.4	1.8	1.7	1.8	0	2.4	1.9	2.0	1.3	2.3	1.9
	N	4	2	16	22	9	1	27	37	13	3	42	59
	$\bar{X}$	3.4	4.3	4.4	4.1	4.2	5.2	5.1	4.9	3.7	4.6	4.7	4.2
N	sd	1.5	1.5	2.0	1.5	1.5	1.7	1.6	1.6	1.4	1.5	1.7	1.5
	N	19	13	41	73	11	8	29	48	30	21	71	121
	$\bar{X}$	3.8	3.9	4.7	4.5	5.9	5.2	6.2	5.8	4.9	4.5	5.4	5.1
Total	sd	2.1	1.4	1.9	1.5	1.7	1.6	2.3	1.7	1.9	1.5	2.1	1.1
	N	23	15	57	95	20	9	56	85	43	24	113	180

TABLE XVIII

MEAN READING ACHIEVEMENT-GROUP SCORES OF HIGH AND LOW ACHIEVING PUPILS GROUPED ACCORDING TO SEX, RACE, GRADE, AND TEACHER MARKS

		Boys				Girls				Boys and Girls			
		Indian	Negro	White	Total	Indian	Negro	White	Total	Indian	Negro	White	Total
4th Grade													
	$\bar{X}$	1.00	.50	.50	.54	.57	.67	1.00	.73	.62	.57	.73	.65
S	sd	0	.577	.577	.522	.502	.500	0	.334	.488	.577	.314	.454
	N	1	4	6	11	7	3	5	15	8	7	11	26
	$\bar{X}$	.30	.67	.29	.39	1.00	.17	.34	.32	.36	.47	.32	.38
N	sd	.496	.500	.465	.487	0	.408	.497	.314	.452	.167	.479	.366
	N	10	9	7	26	1	6	12	19	11	15	19	45
	$\bar{X}$	.37	.62	.38	.43	.63	.34	.52	.50	.47	.50	.47	.48
To-tal	sd	.500	.462	.506	.489	.239	.464	.350	.324	.466	.292	.303	.364
	N	11	13	13	37	8	9	17	34	19	22	30	71
6th Grade													
	$\bar{X}$	.38	.33	.61	.48	.55	.67	.71	.66	.48	.50	.65	.54
S	sd	.518	.577	.499	.525	.522	.500	.458	.490	.521	.577	.473	.525
	N	8	3	23	34	11	3	35	49	19	6	58	83
	$\bar{X}$	.27	.25	.35	.30	.33	.17	.10	.18	.39	.22	.24	.25
N	sd	.458	.452	.485	.468	.500	.408	.301	.389	.472	.432	.400	.434
	N	15	12	34	61	9	6	21	36	24	18	55	97
	$\bar{X}$	.32	.26	.48	.37	.44	.42	.41	.42	.43	.29	.46	.39
To-tal	sd	.485	.521	.488	.498	.515	.490	.370	.461	.495	.463	.437	.475
	N	23	15	57	95	20	9	56	85	43	24	113	180

TABLE XIX

MEAN ARITHMETIC ACHIEVEMENT-GROUP SCORES OF HIGH AND LOW ACHIEVING PUPILS GROUPED ACCORDING TO SEX, RACE, GRADE, AND TEACHER MARKS

		Boys				Girls				Boys and Girls			
		Indian	Negro	White	Total	Indian	Negro	White	Total	Indian	Negro	White	Total
4th Grade													
	$\bar{X}$	.34	.67	.50	.50	.67	1.00	.50	.72	.51	.78	.50	.57
S	sd	.541	.408	.506	.461	.500	0	.577	.388	.520	.272	.543	.424
	N	3	6	8	17	3	3	10	16	6	9	18	33
	$\bar{X}$	.37	.43	.40	.40	.60	.67	.28	.52	.46	.37	.30	.46
N	sd	.535	.535	.548	.539	.497	.408	.468	.458	.519	.482	.508	.498
	N	8	7	5	20	5	6	7	18	13	13	12	28
	$\bar{X}$	.38	.54	.54	.49	.63	.78	.41	.62	.68	.54	.42	.53
Total	sd	.537	.472	.520	.509	.516	.268	.541	.423	.530	.391	.524	.479
	N	11	13	13	37	8	9	17	34	19	22	30	71
6th Grade													
	$\bar{X}$	.83	.50	.61	.63	.86	.25	.66	.61	.84	.37	.65	.62
S	sd	.408	.577	.499	.497	.378	.500	.482	.461	.394	.535	.490	.476
	N	6	4	23	33	7	4	32	43	13	8	55	76
	$\bar{X}$	.53	.36	.45	.44	.38	.33	.38	.37	.44	.34	.42	.40
N	sd	.514	.504	.506	.506	.506	.516	.495	.504	.511	.508	.503	.507
	N	17	11	34	62	13	5	24	42	30	16	58	104
	$\bar{X}$	.68	.43	.53	.55	.62	.29	.41	.47	.56	.35	.53	.49
Total	sd	.469	.545	.501	.501	.458	.509	.481	.479	.475	.519	.498	.497
	N	23	15	57	95	20	9	56	85	43	24	113	180

TABLE XX

MEAN SPELLING ACHIEVEMENT-GROUP SCORES OF HIGH AND LOW ACHIEVING PUPILS GROUPED ACCORDING TO SEX, RACE, GRADE, AND TEACHER MARKS

		Boys				Girls				Boys and Girls			
		Indian	Negro	White	Total	Indian	Negro	White	Total	Indian	Negro	White	Total
4th Grade													
	$\bar{X}$	.14	1.00	.33	.49	.57	.60	.86	.68	.36	.82	.56	.56
S	sd	.408	0	.500	.226	.424	.573	.378	.480	.416	.260	.444	.381
	N	7	6	9	22	7	5	7	19	14	11	16	41
	$\bar{X}$	.25	.28	0	.19	1.00	0	.10	.13	.40	.15	.07	.15
N	sd	.500	.416	0	.321	0	0	.316	.210	.400	.265	.225	.298
	N	4	7	4	15	1	4	10	15	5	11	14	30
	$\bar{X}$	.18	.61	.23	.29	.62	.33	.41	.47	.37	.48	.33	.39
Total	sd	.441	.224	.346	.368	.371	.318	.361	.352	.410	.263	.335	.359
	N	11	13	13	37	8	0	17	34	19	22	30	71
6th Grade													
	$\bar{X}$	.67	.80	.59	.64	.67	.43	.54	.59	.67	.58	.55	.61
S	sd	.500	.447	.499	.489	.488	.535	.505	.508	.493	.485	.502	.496
	N	9	5	32	46	15	8	40	63	24	12	73	109
	$\bar{X}$	.36	.10	.32	.26	.40	1.00	.27	.38	.37	.53	.30	.31
N	sd	.497	.316	.476	.469	.548	.000	.458	.457	.527	.144	.470	.382
	N	14	10	25	49	5	1	16	22	19	12	40	71
	$\bar{X}$	.51	.45	.46	.47	.53	.71	.40	.55	.53	.56	.43	.49
Total	sd	.498	.382	.490	.451	.520	.266	.480	.492	.508	.315	.485	.470
	N	23	15	57	95	20	9	56	85	43	24	113	180

TABLE XXI

MEAN LANGUAGE ACHIEVEMENT-GROUP SCORES OF HIGH AND LOW ACHIEVING PUPILS GROUPED ACCORDING TO SEX, RACE, GRADE, AND TEACHER MARKS

		Boys				Girls				Boys and Girls			
		Indian	Negro	White	Total	Indian	Negro	White	Total	Indian	Negro	White	Total
4th Grade													
S	$\bar{X}$		.80	.43	.62	.82	1.00	.50	.72	.82	.87	.47	.66
	sd		.403	.535	.470	.408	0	.577	.365	.408	.251	.560	.441
	N	0	5	7	12	6	3	20	19	6	8	17	31
N	$\bar{X}$	.18	.63	.50	.44	.50	.34	.43	.38	.23	.50	.46	.40
	sd	.402	.516	.577	.448	.577	.588	.535	.566	.441	.552	.519	.471
	N	11	8	6	25	2	6	7	15	13	14	13	40
Total	$\bar{X}$	.18	.68	.46	.45	.74	.55	.47	.55	.41	.55	.39	.50
	sd	.402	.451	.556	.459	.451	.381	.559	.489	.420	.410	.558	.464
	N	11	13	13	37	8	9	17	34	19	22	30	71
6th Grade													
S	$\bar{X}$	.75	0	.81	.41	.89	0	.70	.73	.81	0	.73	.52
	sd	.500	.000	.403	.384	.333	.000	.465	.418	.399	.000	.439	.394
	N	4	2	16	22	9	1	26	36	13	3	42	58
N	$\bar{X}$	.42	.46	.50	.47	.09	.25	.33	.29	.28	.33	.42	.34
	sd	.507	.519	.506	.511	.302	.463	.479	.424	.431	.499	.498	.463
	N	19	13	41	73	11	8	20	49	30	21	71	122
Total	$\bar{X}$	.59	.23	.66	.45	.49	.13	.52	.38	.55	.29	.59	.40
	sd	.505	.253	.463	.406	.319	.231	.473	.422	.421	.458	.468	.419
	N	23	15	57	95	20	9	56	85	43	24	113	180

On the average, there appear to be more high achieving pupils receiving satisfactory teacher marks than unsatisfactory teacher marks, and more low achieving pupils receiving unsatisfactory teacher marks than satisfactory teacher marks. There appear to be more high achieving girls than boys who received satisfactory teacher marks, except in the case of sixth grade arithmetic and spelling, where a slightly greater number of boys than girls received satisfactory teacher marks.

Arithmetic scores, Table XIX, show the least amount of differentiation between high and low achieving pupils who received satisfactory and unsatisfactory teacher marks. Spelling scores, Table XX, show the most amount of differentiation between high and low achieving children who received satisfactory and unsatisfactory teacher marks. There do not appear to be any substantial differences between races in teacher marking habits.

Statistical Analysis

The statistical procedure used in this study was a form of three-way analysis of variance (Hays, 1963). The three factors involved in the analysis were children's sex (boys and girls), race (American Indian, Negro, and white), and teacher assessment of achievement (satisfactory and unsatisfactory). The 2 x 3 x 2 design was used to investigate how standardized achievement scores and how IQ scores relate to teacher assessment. An analysis of covariance controlling the effect of IQ on achievement was also used. To measure teacher bias in marking habits, an analysis of variance as described by Lunney (1968) was performed. The same 2 x 3 x 2 design was used, with the dependent variable, high or low achievement score, reported as values of a Bernouilli variable. "Success", or above the median in achievement, was recorded as one, and "failure", or below the median in achievement, was recorded as zero. All the statistical programs were processed on the Control Data 6600 Computer at the University of Minnesota Computer Center.

The first two factors of the design, sex and race, were arranged in a crossed manner; that is, six sub-groups were formed by considering all combinations of these factors. The third factor, teacher assessment of achievement, was nested within combinations of the two crossed factors. The three-factor system allowed six comparisons of the two assessment levels, one for each of the six sub-groups. The design selected led to the statement of 13 hypotheses, each divided into four sections, for each of the four variables (reading, arithmetic, spelling, and language) studied. In order to secure the most dependable measures available under the conditions of the investigation, the generally small number of subjects in the present study made it desirable to combine the data from the fourth and sixth grade samples. After careful consideration of values to be gained and lost, the statistical analysis was, therefore, performed with the data of the combined fourth and sixth grades, and also with the data of the sixth grade sample alone.

Table XXII shows in graphic form the basic design of the study. As can be seen, there are 12 cells derived from the three basic factors.

Hypotheses

I. There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between boys and girls in:

a. reading
b. arithmetic
c. spelling
d. language.

II. There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between boys and girls receiving satisfactory marks and boys and girls receiving unsatisfactory marks in:

a. reading
b. arithmetic
c. spelling
d. language.

III. There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between Indian, Negro, and white boys and girls in:

a. reading
b. arithmetic
c. spelling
d. language.

IV. There are no measurable interactions of children's sex and teacher assessment associated with (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils in:

TABLE XXII

BASIC DESIGN OF THE STUDY

TEACHER ASSESS-MENT		BOYS			GIRLS	
	INDIAN	NEGRO	WHITE	INDIAN	NEGRO	WHITE
SATISFACTORY (S)						
UNSATISFACTORY (N)						

a. reading
b. arithmetic
c. spelling
d. language.

V. There are no measurable interactions of children's sex and racial background associated with (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils in:

a. reading
b. arithmetic
c. spelling
d. language.

VI. There are no measurable interactions of children's racial background and teacher assessment associated with (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils in:

a. reading
b. arithmetic
c. spelling
d. language.

VII. There are no measurable interactions of children's sex, teacher assessment, and racial background associated with (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils in:

a. reading
b. arithmetic
c. spelling
d. language.

VIII. There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between boys receiving satisfactory marks and boys receiving unsatisfactory marks in:

a. reading
b. arithmetic
c. spelling
d. language.

IX. There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between Indian, Negro, and white boys in:

a. reading
b. arithmetic
c. spelling
d. language.

X. There are no measurable interactions of boys' racial background and teacher assessment associated with (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils in:

a. reading
b. arithmetic
c. spelling
d. language.

XI. There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between girls receiving satisfactory marks and girls receiving unsatisfactory marks in:

a. reading
b. arithmetic
c. spelling
d. language.

XII. There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between Indian, Negro and white girls in:

a. reading
b. arithmetic
c. spelling
d. language.

Summary

A pupil sample of 251 subjects and a teacher sample of 18 subjects were selected from the fourth and sixth grade classes of five selected inner-city schools in Special School District Number 1. The pupil sample consisted of 132 boys and 119 girls, all of whom had been in attendance for the academic year 1967-68. The pupil sample contained 62 Indian, 46 Negro, and 143 white children. The teacher sample contained nine men and nine women.

The children were classified on the basis of sex, grade, intelligence quotient scores, tested achievement, and teacher assessment of achievement. Data collected on achievement (reading, arithmetic, spelling, and language) were scores from the *Iowa Tests of Basic Skills*. Socio-economic status was ascertained by use of the *Minnesota Scale for Paternal Occupations*, a pupil questionnaire, and school records. A questionnaire was administered to the teachers to determine marking procedures.

Descriptive statistics of both the teacher and the pupil sample were given. Two forms of a three-way analysis of variance and an analysis of covariance were used. Two factors, sex and race, were crossed, and the third, teacher assessment of achievement, was nested within the combination of the other two factors. Hypotheses to be tested were listed.

CHAPTER III

ANALYSIS OF THE DATA

Descriptive statistics on both the pupil sample and the teacher sample involved in this investigation were presented in Chapter II. The frequency distributions of the pupils according to the relevant independent variables were given. Descriptive statistics of the teacher sample were shown together with the distribution of teacher responses to the questionnaire about factors they considered to influence marks.

In Chapter III the data on the outcome variables will be analyzed and discussed. The discussion will focus on the 13 hypotheses listed in Chapter II, and they will be presented in the same sequence. Each hypothesis is designed to include the four outcome variables, reading, arithmetic, spelling, and language, and analyses of the fourth and sixth grade samples combined, and the sixth grade sample alone. Each variable involves separate analyses of variance and of covariance. The results of the tests of significance will be indicated in the discussion of each hypothesis. In order to avoid unnecessary duplication, the analyses can be located in Appendix D, and can be referred to in Tables XXXVI to LI. A summary of the findings will complete the chapter.

Hypothesis 1: Sex Differences in Scores: There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between boys and girls in:

a. reading
b. arithmetic
c. spelling
d. language.

Table XXIII shows a comparison of the mean scores obtained by boys and girls on each of the four outcome variables investigated.

As can be seen in Table XXIII, in each comparison of achievement scores, the average score obtained by girls was higher than the average score obtained by boys. In every case but sixth grade arithmetic the difference favoring the girls was significant. The null hypothesis 1:1 is rejected on all outcomes, with the exception of sixth grade arithmetic for which it is accepted.

TABLE XXIII

MEAN SCORES FOR BOYS AND GIRLS IN READING, ARITHMETIC, SPELLING, AND LANGUAGE

			Achievement		Adjusted Achievement		IQ		Achievement Group	
Subject	Sex	N	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.
4th and 6th Grade										
Read.	B	132	2.2	.05	2.2	.05	83.4	NS	.40	NS
	G	119	2.6		2.7		86.9		.45	
Arith.	B	132	2.0	.05	2.0	NS	83.4	NS	.52	NS
	G	119	2.3		2.2		86.9		.49	
Spell.	B	132	1.2	.01	1.3	.01	83.4	NS	.45	NS
	G	119	1.6		1.7		86.9		.43	
Lang.	B	132	4.3	.05	4.6	.01	83.4	NS	.56	NS
	G	119	5.3		5.7		86.9		.50	
6th Grade										
Read.	B	95	2.3	.05	2.4	NS	81.3	NS	.37	NS
	G	85	2.8		2.7		84.7		.42	
Arith.	B	95	2.1	NS	2.2	NS	81.3	NS	.55	NS
	G	85	2.2		2.3		84.7		.47	
Spell.	B	95	1.4	.01	1.4	.01	81.3	NS	.47	NS
	G	85	2.0		2.0		84.7		.55	
Lang.	B	95	4.5	.01	4.9	.01	81.3	NS	.49	NS
	G	85	5.8		5.9		84.7		.38	

In each comparison of achievement scores adjusted for IQ control, girls again obtained higher mean scores than boys. The differences favoring the girls were significant for fourth and sixth grade reading, spelling, and language, and for sixth grade spelling and language. The null hypothesis 1:2 is rejected on the outcomes of fourth and sixth grade reading, spelling, and language, and sixth grade spelling and language. The null hypothesis 1:2 is accepted for the outcomes of fourth and sixth grade arithmetic, and sixth grade reading and arithmetic, and rejected for fourth and sixth grade reading, spelling, and language, and sixth grade spelling and language.

IQ comparisons indicate that girls' average scores are higher than boys' average scores. For both groups, however, the differences favoring the girls were not significant. The null hypothesis 1:3 is accepted on all outcomes.

In the comparisons of mean achievement-group scores of high and low achieving pupils, more boys than girls received satisfactory teacher marks in fourth and sixth grade arithmetic, spelling, and language, and in sixth grade arithmetic and language. In every case the differences between boys and girls were not significant. The null hypothesis 1:4 is accepted on all outcomes.

Hypothesis 2: Differences in Scores by Teacher Assessment: There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between boys and girls receiving satisfactory teacher marks and boys and girls receiving unsatisfactory teacher marks in:

a. reading
b. arithmetic
c. spelling
d. language.

Table XXIV shows a comparison of the mean scores obtained by pupils receiving satisfactory marks and those receiving unsatisfactory marks.

As can be observed in Table XXIV, the pupils receiving satisfactory marks had higher achievement scores than the pupils receiving unsatisfactory marks. In each case the difference was significant at the .01 level. The null hypothesis 2:1 is rejected for the four achievement areas.

TABLE XXIV

MEAN SCORES FOR PUPILS RECEIVING SATISFACTORY AND UNSATISFACTORY TEACHER MARKS IN READING, ARITHMETIC, SPELLING, AND LANGUAGE

			Achievement		Adjusted Achievement		IQ		Achievement Group	
Subject	Mark	N	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.
4th and 6th Grade										
Read.	S	109	2.9	.01	2.7	.01	89.1	.01	.59	.01
	N	142	2.1		2.1		78.9		.33	
Arith.	S	108	2.5	.01	2.4	.05	90.8	.01	.60	.01
	N	143	2.0		2.1		80.2		.38	
Spell.	S	104	1.7	.01	1.7	.01	87.5	.01	.60	.01
	N	147	1.0		1.1		79.6		.28	
Lang.	S	79	5.5	.01	5.8	.01	90.7	.01	.58	.01
	N	162	4.0		4.5		81.2		.35	
6th Grade										
Read.	S	83	3.1	.01	2.8	.01	85.7	.01	.54	.01
	N	97	2.2		2.2		78.1		.25	
Arith.	S	76	2.7	.01	2.5	.05	86.7	.01	.62	.05
	N	104	2.0		2.2		78.1		.40	
Spell.	S	110	2.0	.01	1.9	.01	84.1	.05	.61	NS
	N	70	1.1		1.4		77.5		.40	
Lang.	S	121	6.0	.01	5.8	.01	85.6	.05	.52	NS
	N	59	4.2		4.8		79.6		.34	

When achievement scores are adjusted for IQ, children receiving satisfactory marks again all scored higher than those receiving unsatisfactory marks. In each case the difference was significant at the .01 level, except in arithmetic, where the difference was significant at the .05 level. The null hypothesis 2:2 is rejected on all outcomes.

Again looking at Table XXIV, it can be seen that pupils receiving satisfactory marks obtained higher IQ scores than those with unsatisfactory marks. The differences are significant at the .01 level for fourth and sixth grade reading, arithmetic, spelling, and language, and for sixth grade reading and arithmetic. Sixth grade spelling and language show the difference to be at the .05 level of significance. The null hypothesis 2:3 is rejected in all cases.

In the comparison of mean achievement-group scores, it can be seen that more high achieving pupils receive satisfactory teacher marks than unsatisfactory teacher marks. All the differences for the fourth and sixth grade are significant at the .01 level. Sixth grade differences are significant at the .01 level for reading, .05 level for arithmetic, and not significant for spelling and language. The null hypothesis 2:4 is accepted for sixth grade spelling and language, and is rejected for all other outcomes.

Hypothesis 3: Differences in Scores by Race: There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between Indian, Negro, and white boys and girls in:

a. reading
b. arithmetic
c. spelling
d. language.

Table XXV shows the mean scores of Indian, Negro, and white boys and girls.

It is apparent that the achievement scores of the three races did not differ to a great extent. In most cases the white pupils had slightly higher scores than the other two races. The *F* ratio obtained from the analysis of variance in every case was below the critical limit indicating non-significant differences. The null hypothesis 3:1 is accepted on all outcomes.

TABLE XXV

MEAN SCORES OF INDIAN, NEGRO, AND WHITE CHILDREN IN READING, ARITHMETIC, SPELLING, AND LANGUAGE

			Achievement		Adjusted Achievement		IQ		Achievement Group	
Subject	Race	N	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.
4th and 6th Grade										
Read.	I	62	2.3	NS	2.6	NS	82.6	.05	.42	NS
	N	46	2.2		2.4		82.7		.42	
	W	143	2.5		2.5		86.8		.46	
Arith.	I	62	2.2	NS	2.2	NS	82.6	.05	.59	NS
	N	46	2.0		2.0		82.7		.51	
	W	143	2.3		2.2		86.8		.46	
Spell.	I	62	1.5	NS	1.6	NS	82.6	.05	.49	NS
	N	46	1.4		1.4		82.7		.44	
	W	143	1.4		1.3		86.8		.39	
Lang.	I	62	4.4	NS	5.2	NS	82.6	.05	.53	NS
	N	46	4.4		4.6		82.7		.51	
	W	143	4.8		5.1		86.8		.54	
6th Grade										
Read.	I	43	2.5	NS	2.7	NS	79.9	.05	.38	NS
	N	24	2.2		2.6		79.6		.35	
	W	113	2.7		2.6		84.5		.45	
Arith.	I	43	2.3	NS	2.3	NS	79.9	.05	.65	NS
	N	24	2.1		2.1		79.6		.36	
	W	113	2.4		2.3		84.5		.57	
Spell.	I	43	1.7	NS	1.8	NS	79.9	.05	.52	NS
	N	24	1.5		1.9		79.6		.58	
	W	113	1.7		1.4		84.5		.43	
Lang.	I	43	4.9	NS	5.7	NS	79.9	.05	.54	NS
	N	24	4.5		5.0		79.6		.18	
	W	113	5.4		5.4		84.5		.59	

When achievement scores were adjusted for IQ, however, the Indian sample scored higher than or equal to the white sample in seven out of eight cases. The differences were all shown to be non-significant. The null hypothesis 3:2 is accepted on all outcomes.

The Indian and Negro samples' IQ scores at both grade levels are similar. The white sample received higher IQ scores at both levels. The differences are significant at the .05 level of confidence. The null hypothesis 3:3 is rejected on all outcomes.

There does not appear to be a consistent trend in the achievement-group scores of high and low achieving pupils. The only significant difference is found in sixth grade language, where the low scores of Negro students result in a .05 level of significance. The null hypothesis 3:4 is accepted on all outcomes, except for sixth grade language, where the null hypothesis is rejected.

Hypothesis 4: Interaction of Sex and Teacher Assessment: There are no measurable interactions of children's sex and teacher assessment associated with (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils in:

a. reading
b. arithmetic
c. spelling
d. language.

Table XXVI shows the scores of boys and girls receiving satisfactory and unsatisfactory teacher marks.

It can be observed that in all mean achievement scores, mean achievement scores adjusted for IQ, and mean IQ scores, girls received higher scores than boys, as did boys and girls receiving satisfactory teacher marks. The scores in reading, arithmetic, and spelling were all below grade level. Language scores were the highest of all four achievement variables. When the differences over the four subsections of hypothesis 4 were tested by their respective analyses of variance and covariance, non-significant differences were found in every case. The interaction hypotheses 4:1, 4:2, 4:3, and 4:4 are accepted on all outcomes.

TABLE XXVI

MEAN SCORES FOR BOYS AND GIRLS RECEIVING SATISFACTORY AND UNSATISFACTORY TEACHER MARKS

		N		Achievement			Adjusted Achievement			IQ			Achievement Group		
Subject	Sex	S	N	$S\bar{X}$	$N\bar{X}$	Sig.	$S\bar{X}$	$N\bar{X}$	Sig.	$S\bar{X}$	$N\bar{X}$	Sig.	$S\bar{X}$	$N\bar{X}$	Sig.
4th and 6th Grade															
Read.	B	45	87	2.5	1.9	NS	2.2	2.1	NS	86.0	80.6	NS	.48	.34	NS
	G	64	55	2.9	2.3		2.9	2.6		92.2	80.5		.68	.24	
Arith.	B	51	81	2.1	1.8	NS	2.1	1.9	NS	88.3	78.9	NS	.61	.44	NS
	G	57	62	2.4	2.0		2.3	2.2		93.3	81.4		.67	.42	
Spell.	B	69	64	1.5	0.9	NS	1.5	1.0	NS	88.8	78.1	NS	.64	.26	NS
	G	84	35	1.9	1.3		1.9	1.3		88.3	80.9		.57	.30	
Lang.	B	34	98	5.2	4.0	NS	5.2	4.1	NS	88.8	81.6	NS	.67	.45	NS
	G	55	64	5.8	4.6		6.1	4.8		94.0	82.4		.73	.26	
6th Grade															
Read.	B	34	61	2.4	2.1	NS	2.4	2.3	NS	82.9	79.0	NS	.43	.29	NS
	G	49	36	3.3	2.4		2.8	3.1		88.6	77.2		.62	.20	
Arith.	B	34	61	2.3	1.9	NS	2.2	2.0	NS	84.7	81.2	NS	.68	.45	NS
	G	42	43	2.5	2.1		2.7	2.2		89.1	74.9		.58	.39	
Spell.	B	47	48	1.7	1.0	NS	1.6	1.1	NS	83.3	77.1	NS	.68	.26	NS
	G	64	21	2.0	1.5		2.1	2.1		84.8	77.7		.54	.56	
Lang.	B	22	73	5.3	4.2	NS	5.5	4.3	NS	84.1	79.2	NS	.52	.46	NS
	G	37	48	6.8	4.9		6.7	5.3		87.0	79.2		.53	.22	

Hypothesis 5: Interaction of Race and Sex: There are no measurable interactions of children's sex and racial background associated with (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils in:

a. reading
b. arithmetic
c. spelling
d. language.

The mean scores of Indian, Negro, and white boys and girls are depicted in Table XXVII.

An inspection of Table XXVII reveals that Indian, Negro, and white girls obtained higher mean scores than boys in achievement, achievement adjusted for IQ, and IQ. There was no consistent trend in mean achievement-group scores. There were no measurable interactions of children's sex and racial background at either grade level. The null hypotheses 5:1, 5:2, 5:3, and 5:4 are accepted on all four outcome variables.

Hypothesis 6: Interaction of Race and Teacher Assessment: There are no measurable interactions of children's racial background and teacher assessment associated with (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores for high and low achieving pupils in:

a. reading
b. arithmetic
c. spelling
d. language.

The mean scores of Indian, Negro, and white pupils receiving satisfactory and unsatisfactory teacher marks are presented in Table XXVIII.

Table XXVIII shows that the achievement scores of Indian and white pupils receiving satisfactory and unsatisfactory marks were higher than those of the Negro pupils. The scores of Indian, Negro, and white pupils receiving satisfactory marks were consistently higher than those receiving unsatisfactory marks. The analyses of variance resulted in no significant differences in all achievement areas, with the exception of language score differences, where the levels of significance were .05. The Negro pupils had the lowest scores in this area. The null hypothesis 6:1 is rejected for the achievement area of language, and is accepted for all other outcomes.

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TABLE XXVII

MEAN SCORES FOR INDIAN, NEGRO, AND WHITE BOYS AND GIRLS

		N		Achievement			Adjusted Achievement			IQ			Achievement Group		
Subject	Race	B	G	$B\overline{X}$	$G\overline{X}$	Sig.	$B\overline{X}$	$G\overline{X}$	Sig.	$B\overline{X}$	$G\overline{X}$	Sig.	$B\overline{X}$	$G\overline{X}$	Sig.
4th and 6th Grade															
Read.	I	34	28	1.7	3.1	NS	2.2	3.0	NS	78.6	87.5	NS	.36	.47	NS
	N	28	18	2.2	2.2		2.2	2.6		82.5	82.8		.42	.42	
	W	70	73	2.3	2.6		2.3	2.7		85.9	87.6		.46	.47	
Arith.	I	34	28	1.9	2.4	NS	1.4	2.4	NS	78.6	87.5	NS	.57	.62	NS
	N	28	18	1.9	2.1		1.9	2.1		82.5	82.8		.50	.53	
	W	70	73	2.2	2.2		2.1	2.3		85.9	87.6		.51	.49	
Spell.	I	34	28	1.0	1.7	NS	1.2	2.0	NS	78.6	87.5	NS	.41	.56	NS
	N	28	18	1.3	1.6		1.3	1.6		82.5	82.8		.54	.35	
	W	70	73	1.3	1.7		1.2	1.5		85.9	87.6		.40	.39	
Lang.	I	34	28	3.3	5.6	NS	5.2	5.4	NS	78.6	87.5	NS	.54	.51	NS
	N	28	18	4.0	4.7		4.2	5.3		82.5	82.8		.55	.47	
	W	70	73	4.4	5.4		4.6	5.6		85.9	87.6		.59	.50	
6th Grade															
Read.	I	23	20	2.1	2.9	NS	2.4	3.0	NS	76.4	84.0	NS	.32	.44	NS
	N	15	9	2.0	2.6		2.0	3.3		80.6	78.0		.26	.42	
	W	57	56	2.5	2.9		2.2	2.7		85.9	86.0		.48	.41	
Arith.	I	23	20	2.0	2.4	NS	2.2	2.4	NS	76.4	84.0	NS	.68	.62	NS
	N	15	9	2.0	2.1		2.0	2.2		80.6	78.0		.43	.29	
	W	57	56	2.2	2.5		2.2	2.5		85.9	86.0		.53	.41	
Spell.	I	23	20	1.3	2.1	NS	1.5	2.1	NS	76.4	84.0	NS	.51	.53	NS
	N	15	9	1.3	2.0		1.3	2.6		80.6	78.0		.45	.71	
	W	57	56	1.4	2.1		1.2	1.7		85.9	86.0		.46	.40	
Lang.	I	23	20	3.8	5.9	NS	5.4	5.9	NS	76.4	84.0	NS	.59	.49	NS
	N	15	9	3.9	5.2		3.7	6.0		80.6	78.0		.23	.13	
	W	57	56	4.7	6.2		4.9	6.0		85.9	86.0		.66	.52	

TABLE XXVIII

MEAN SCORES OF INDIAN, NEGRO, AND WHITE PUPILS RECEIVING SATISFACTORY AND UNSATISFACTORY TEACHER MARKS

4th and 6th Grade		N		Achievement			Adjusted Achievement			IQ			Achievement Group		
Subject	Race	S	N	S$\bar{X}$	N$\bar{X}$	Sig.	S$\bar{X}$	N$\bar{X}$	Sig.	S$\bar{X}$	N$\bar{X}$	Sig.	S$\bar{X}$	N$\bar{X}$	Sig.
Read.	I	27	35	2.7	2.1	NS	2.7	2.6	NS	85.2	79.9	NS	.50	.34	NS
	N	13	33	2.7	2.0		2.5	2.3		91.2	77.9		.54	.30	
	W	69	74	3.0	2.1		2.8	2.2		90.9	83.9		.67	.27	
Arith.	I	19	43	2.4	2.0	NS	2.2	2.1	NS	90.1	80.0	NS	.73	.46	NS
	N	15	41	2.1	1.9		2.0	2.1		90.0	78.2		.60	.43	
	W	74	69	2.5	2.0		2.4	2.0		92.0	82.3		.59	.40	
Spell.	I	38	24	1.7	1.1	NS	1.7	1.5	NS	85.7	78.3	NS	.56	.42	NS
	N	23	22	1.8	0.9		1.7	1.1		87.7	79.0		.70	.20	
	W	92	51	1.7	1.1		1.6	1.0		89.2	81.5		.55	.24	
Lang.	I	19	43	6.6	3.2	.05	6.5	4.0	.01	87.0	81.3	NS	.88	.49	NS
	N	10	36	4.6	4.3		4.8	4.8		93.6	79.1		.62	.49	
	W	60	83	5.9	4.2		5.5	4.6		92.2	84.0		.67	.42	
6th Grade															
Read.	I	19	24	2.9	2.3	NS	2.8	2.6	NS	82.8	78.0	NS	.46	.30	NS
	N	6	18	2.8	2.1		2.6	2.6		85.8	76.3		.50	.29	
	W	58	55	3.2	2.2		2.8	2.3		88.6	81.9		.66	.22	
Arith.	I	13	30	2.6	2.0	NS	2.5	2.2	NS	87.2	77.4	NS	.84	.46	NS
	N	7	17	2.1	2.0		2.1	2.2		83.3	75.1		.48	.35	
	W	56	57	2.6	2.0		2.4	2.1		89.7	81.7		.63	.42	
Spell.	I	24	19	2.1	1.2	NS	2.1	1.6	NS	82.5	76.6	NS	.67	.38	NS
	N	12	11	2.0	1.0		2.0	1.9		82.5	77.0		.61	.55	
	W	74	40	1.9	1.2		1.6	1.2		87.3	79.0		.57	.29	
Lang.	I	13	30	7.3	3.7	.05	7.1	4.4	.01	82.0	78.7	NS	.82	.26	NS
	N	3	21	4.2	4.6		4.5	5.4		84.0	76.8		.00	.36	
	W	43	70	6.6	4.7		6.0	4.7		88.7	83.4		.76	.42	

The interaction of race and teacher assessment marks on achievement scores adjusted for IQ was found to be significant at the .01 level for language, and non-significant in the other achievement areas. The null hypothesis 6:2 is accepted for reading, arithmetic, and spelling, and is rejected for language.

The IQ scores presented in Table XXVIII reveal that in all cases the Indian, Negro, and white pupils receiving unsatisfactory marks consistently scored lower than those receiving satisfactory marks. This was an anticipated outcome since marks are supposed to reflect student achievement. However, the differences did not prove to be significant after the analysis was completed. Achievement-group differences were also found to be non-significant. The null hypotheses 6:3 and 6:4 are accepted on all outcome variables.

Hypothesis 7: Interaction of Sex, Teacher Assessment, and Race: There are no measurable interactions of children's sex, teacher assessment, and racial background associated with (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils in:

a. reading
b. arithmetic
c. spelling
d. language.

Table XXIX presents the mean scores of Indian, Negro, and white boys and girls receiving satisfactory and unsatisfactory teacher marks.

As can be seen in Table XXIX, the scores of Indian, Negro, and white pupils receiving satisfactory teacher marks were consistently higher than the scores of pupils receiving unsatisfactory teacher marks. Indian, Negro, and white girls, on the average, obtained higher scores in all cases than boys in achievement and adjusted achievement. In almost all cases, more girls received higher satisfactory teacher marks than did boys. When the mean differences were tested by analyses of variance and covariance, non-significant interactions were found in reading, arithmetic, spelling, and language in achievement scores, IQ scores, and achievement-group scores. The null hypotheses 7:1, 7:3, and 7:4 are accepted on all outcomes. The interaction of sex, teacher assessment, and race on adjusted achievement was found to be significant at the .05 level in the area of reading. The null hypothesis 7:2 is rejected for fourth and sixth grade reading, and is accepted on all other outcomes.

TABLE XXIX

MEAN SCORES OF INDIAN, NEGRO, AND WHITE BOYS AND GIRLS RECEIVING SATISFACTORY AND UNSATISFACTORY TEACHER MARKS

4th and 6th Grade		N				Achievement					Adjusted Achievement					IQ					Achievement Group				
		B		G		B		G			B		G			B		G			B		G		
Subject	Race	S	N	S	N	$S\bar{X}$	$N\bar{X}$	$S\bar{X}$	$N\bar{X}$	Sig.	$S\bar{X}$	$N\bar{X}$	$S\bar{X}$	$N\bar{X}$	Sig.	$S\bar{X}$	$N\bar{X}$	$S\bar{X}$	$N\bar{X}$	Sig.	$S\bar{X}$	$N\bar{X}$	$S\bar{X}$	$N\bar{X}$	Sig.
Read.	I	9	25	18	10	2.5	1.7	2.9	2.9	NS	2.7	1.9	2.7	3.1	.05	78.8	78.9	91.6	80.9	NS	.35	.28	.55	.40	NS
	N	7	21	6	12	2.4	2.1	2.9	2.0		2.2	2.3	2.7	2.3		90.6	79.4	91.8	76.5		.43	.43	.67	.17	
	W	29	41	40	33	2.7	2.2	3.3	2.1		2.6	2.3	3.0	2.2		88.7	83.6	93.2	84.1		.58	.34	.75	.18	
Arith.	I	9	25	10	18	2.0	1.8	2.7	2.2	NS	2.0	2.0	2.5	2.2	NS	86.2	76.2	95.1	83.7	NS	.67	.48	.80	.44	NS
	N	10	18	5	13	2.0	1.8	2.1	2.0		1.9	2.0	1.9	2.2		88.5	78.7	91.0	77.9		.60	.39	.60	.46	
	W	32	38	42	31	2.4	2.0	2.7	1.9		2.3	2.1	2.5	2.0		90.2	81.9	93.8	82.7		.58	.45	.62	.35	
Spell.	I	16	18	22	6	1.4	0.9	2.0	1.9	NS	1.5	1.1	1.9	2.0	NS	81.6	76.5	89.9	80.0	NS	.50	.33	.64	.50	NS
	N	11	17	12	5	1.8	0.8	1.8	1.1		1.6	1.0	1.8	1.2		91.2	76.4	84.1	81.6		.91	.18	.50	.20	
	W	42	29	50	24	1.5	0.9	1.9	0.9		1.4	1.0	1.8	1.1		87.7	81.7	90.7	81.3		.52	.28	.58	.21	
Lang.	I	4	30	15	13	6.7	3.4	6.7	4.1	NS	6.3	3.5	6.9	3.9	NS	85.5	79.8	89.8	85.5	NS	.75	.33	.87	.15	NS
	N	7	21	3	15	4.2	4.3	6.3	4.5		4.2	4.1	6.3	4.9		89.4	79.7	97.7	78.3		.57	.52	.67	.27	
	W	23	47	37	36	5.3	4.3	6.5	4.8		5.3	4.2	6.5	5.0		91.6	83.2	94.5	83.5		.70	.49	.65	.35	
6th Grade																									
Read.	I	8	15	11	9	2.4	2.0	3.1	2.7	NS	2.7	2.4	2.9	2.9	NS	77.9	75.6	87.6	80.4	NS	.38	.27	.55	.33	NS
	N	3	12	3	6	2.1	2.0	3.5	2.2		1.9	2.2	3.3	3.0		85.7	78.7	86.0	70.0		.33	.25	.66	.17	
	W	23	34	35	21	2.9	2.3	3.5	2.1		2.7	2.4	2.9	2.3		85.2	82.7	92.1	81.1		.61	.35	.71	.10	
Arith.	I	6	17	7	13	2.4	1.9	2.8	2.1	NS	2.4	2.2	2.5	2.2	NS	83.5	73.9	90.9	80.9	NS	.83	.53	.86	.38	NS
	N	4	11	3	6	2.1	2.0	2.1	2.1		2.1	2.1	2.0	2.4		83.3	78.9	83.3	71.3		.50	.35	.25	.33	
	W	24	33	32	24	2.5	2.0	2.8	2.1		2.4	2.1	2.5	2.1		87.4	81.0	92.1	82.5		.61	.45	.66	.38	
Spell.	I	9	14	15	5	1.8	1.0	2.2	1.7	NS	2.0	1.3	2.2	1.9	NS	78.6	75.0	86.5	78.2	NS	.67	.36	.67	.40	NS
	N	5	10	7	2	1.8	0.9	2.1	1.5		1.7	1.1	2.2	2.7		86.2	77.0	78.7	77.0		.80	.10	.43	1.00	
	W	33	25	42	15	1.7	1.1	2.7	1.4		1.5	1.1	1.8	1.4		85.4	80.1	89.1	77.8		.59	.32	.54	.27	
Lang.	I	4	19	9	11	6.7	3.4	7.6	4.2	NS	6.9	4.4	7.2	4.3	NS	80.8	75.5	87.3	82.0	NS	.75	.42	.89	.09	NS
	N	2	13	1	8	3.5	4.3	5.6	5.2		3.1	4.7	5.8	6.2		87.0	79.0	81.0	74.6		.00	.46	.00	.25	
	W	16	41	27	29	5.6	4.4	7.2	5.1		5.5	4.5	6.5	5.0		84.6	83.3	92.8	80.8						

Hypothesis 8: Differences in Boys' Scores by Teacher Assessment: There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between boys receiving satisfactory teacher marks, and boys receiving unsatisfactory teacher marks in:

a. reading
b. arithmetic
c. spelling
d. language.

Table XXX presents the mean scores of boys receiving satisfactory and unsatisfactory teacher marks.

Boys receiving satisfactory teacher marks obtained higher achievement scores than boys receiving unsatisfactory marks. The differences for fourth and sixth grade spelling and language, and for sixth grade spelling are significant at the .01 level. Fourth and sixth grade boys' reading and arithmetic, and sixth grade arithmetic and language are significant at the .05 level. Sixth grade reading showed no significant differences. The null hypothesis 8:1 is rejected on all outcomes, with the exception of sixth grade reading, for which it is accepted.

When achievement is adjusted for IQ, there are some changes in the results of the analyses. The differences in fourth and sixth grade reading, and sixth grade arithmetic scores become non-significant. Spelling and language scores differences are significant at the .01 level. The null hypothesis 8:2 is accepted for the areas of reading and arithmetic, but is rejected for spelling and language.

There are also mixed results of the analysis of IQ scores of boys receiving satisfactory and unsatisfactory marks. Fourth and sixth grade IQ scores in arithmetic, and sixth grade IQ scores in reading and arithmetic, are significant at the .01 level. Fourth and sixth grade reading, and sixth grade spelling IQ score differences are significant at the .05 levle. The null hypothesis 8:3 is accepted for fourth and sixth grade spelling and language, and for sixth grade language, and is rejected for all other outcome variables.

The achievement-group scores of boys receiving satisfactory and unsatisfactory marks show that there are more high achieving boys receiving satisfactory teacher marks than unsatisfactory marks. The differences are significant at the .01 level only in spelling. The null hypothesis 8:4 is accepted in all outcome variables, with the exception of spelling, for which it is rejected.

TABLE XXX

MEAN SCORES OF BOYS RECEIVING SATISFACTORY AND UNSATISFACTORY TEACHER MARKS

			Achievement		Adjusted Achievement		IQ		Achievement Group	
Subject	Mark	N	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.
4th and 6th Grade										
Read.	S	45	2.5	.05	2.2	NS	86.0	.05	.48	NS
	N	87	1.9		2.1		80.6		.34	
Arith.	S	51	2.1	.05	2.1	NS	88.3	.01	.61	NS
	N	81	1.8		1.9		78.9		.44	
Spell.	S	68	1.5	.01	1.5	.01	88.8	.01	.64	.01
	N	64	0.9		1.0		78.1		.26	
Lang.	S	34	5.2	.01	5.2	.01	88.0	NS	.67	NS
	N	98	4.0		4.1		81.6		.45	
6th Grade										
Read.	S	34	2.4	NS	2.4	NS	82.9	NS	.43	NS
	N	61	2.1		2.3		79.0		.29	
Arith.	S	34	2.3	.05	2.2	NS	84.7	.05	.68	NS
	N	61	1.9		2.0		81.2		.45	
Spell.	S	47	1.7	.01	1.6	.01	83.3	.05	.68	.01
	N	49	1.0		1.1		77.1		.26	
Lang.	S	22	5.3	.05	5.5	.01	84.1	NS	.52	NS
	N	73	4.2		4.3		79.2		.46	

Hypothesis 9: Differences in Boys' Scores by Race: There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between Indian, Negro, and white boys in:

a. reading
b. arithmetic
c. spelling
d. language.

The mean scores of Indian, Negro, and white boys are shown in Table XXXI.

The achievement scores of white boys were equal to or higher than the scores of Indian and Negro boys in all cases. Indian boys' achievement scores were lower than the other two races. When tested by analyses of variance, however, the differences in mean marks were found to be non-significant for all four achievement areas. The null hypothesis 9:1 is accepted on all outcomes.

When achievement is adjusted for IQ, the pattern of boys' scores change. Indian boys' scores are no longer lowest in all cases. In the sixth grade, Indian boys score higher than or equal to the white and Negro boys in achievement. The differences are statistically non-significant. The null hypothesis 9:2 is accepted on all outcomes.

IQ scores indicate that Indian boys' scores were lower than Negro and white scores. The white boys at both grade levels had the higher scores. All boys' IQ scores changed in a downward swing progressing from the fourth to the sixth grade. The differences for the fourth and sixth grade were significant at the .05 level. The sixth grade showed no statistically significant differences. The null hypothesis 9:3 is rejected on all achievement variables for the fourth and sixth grade, and accepted for the sixth grade.

No significant differences were found in achievement-group scores. The null hypothesis 9:4 is accepted on all outcomes.

Hypothesis 10: Interaction of Boys' Race and Teacher Assessment: There are no measurable interactions of boys' racial background and teacher assessment associated with (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils in:

TABLE XXXI

MEAN SCORES OF INDIAN, NEGRO, AND WHITE BOYS

			Achievement		Adjusted Achievement		IQ		Achievement Group	
Subject	Race	N	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.
4th and 6th Grade										
Read.	I	34	1.7	NS	2.2	NS	78.6	.05	.36	NS
	N	28	2.2		2.2		82.5		.42	
	W	70	2.3		2.3		85.9		.46	
Arith.	I	34	1.9	NS	1.4	NS	78.6	.05	.57	NS
	N	28	1.9		1.9		82.5		.50	
	W	70	2.2		2.1		85.9		.51	
Spell.	I	34	1.0	NS	1.2	NS	78.6	.05	.41	NS
	N	28	1.3		1.3		82.5		.54	
	W	70	1.3		1.2		85.9		.40	
Lang.	I	34	3.3	NS	5.2	NS	78.6	.05	.54	NS
	N	28	4.0		4.2		82.5		.55	
	W	70	4.4		4.6		85.9		.59	
6th Grade										
Read.	I	23	2.1	NS	2.4	NS	76.4	NS	.32	NS
	N	15	2.0		2.0		80.6		.26	
	W	57	2.5		2.2		83.5		.48	
Arith.	I	23	2.0	NS	2.2	NS	76.4	NS	.68	NS
	N	15	2.0		2.0		80.6		.43	
	W	57	2.2		2.2		83.5		.53	
Spell.	I	23	1.3	NS	1.5	NS	76.4	NS	.51	NS
	N	15	1.3		1.3		80.6		.45	
	W	57	1.4		1.2		83.5		.46	
Lang.	I	23	3.8	NS	5.4	NS	76.4	NS	.59	NS
	N	15	3.9		3.7		80.6		.23	
	W	57	4.7		4.9		83.5		.66	

a. reading
b. arithmetic
c. spelling
d. language.

Table XXXII shows the mean scores of Indian, Negro, and white boys receiving satisfactory and unsatisfactory teacher marks.

Observation of mean marks presented in Table XXXII indicate that in all cases in achievement scores of high and low achieving children, the Indian, Negro, and white boys receiving satisfactory marks obtain higher scores than those receiving unsatisfactory marks. The fourth and sixth grade language scores were significantly different at the .05 level. None of the other differences in achievement were found to be significant. The null hypothesis 10:1 is accepted in all instances, with the exception of fourth and sixth grade language, for which it is rejected.

When achievement is adjusted for IQ, fourth and sixth grade language scores result in differences at the .01 level, and sixth grade language scores at the .05 level. The null hypothesis 10:2 is accepted on all outcome variables, with the exception of the achievement area of language, for which it is rejected.

The differences in boys' mean IQ scores are not significant in any of the achievement areas. The null hypothesis 10:3 is accepted on all outcomes. The interaction of race and marks on fourth and sixth grade spelling was found to be significant at the .05 level. The null hypothesis 10:4 is accepted on all outcomes, with the exception of fourth and sixth grade spelling, for which it is rejected.

Hypothesis 11: Differences in Girls' Scores by Teacher Assessment: There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between girls receiving satisfactory teacher marks and girls receiving unsatisfactory teacher marks in:

a. reading
b. arithmetic
c. spelling
d. language.

The mean scores of girls receiving satisfactory and unsatisfactory teacher marks are shown in Table XXXIII.

TABLE XXXII

MEAN SCORES OF INDIAN, NEGRO, AND WHITE BOYS RECEIVING SATISFACTORY AND UNSATISFACTORY TEACHER MARKS

4th and 6th Grade		N		Achievement			Adjusted Achievement			IQ			Achievement Group		
Subject	Race	S	N	$\overline{SX}$	$\overline{NX}$	Sig.	$\overline{SX}$	$\overline{NX}$	Sig.	$\overline{SX}$	$\overline{NX}$	Sig.	$\overline{SX}$	$\overline{NX}$	Sig.
Read.	I	9	25	2.5	1.7	NS	2.7	1.9	NS	78.8	78.9	NS	.35	.28	NS
	N	7	21	2.4	2.1		2.2	2.3		90.6	79.4		.43	.43	
	W	29	41	2.7	2.2		2.6	2.3		88.7	83.6		.59	.34	
Arith.	I	9	25	2.0	1.8	NS	2.0	2.0	NS	86.2	76.2	NS	.67	.48	NS
	N	10	18	2.0	1.8		1.9	2.0		88.5	78.7		.60	.39	
	W	32	38	2.4	2.0		2.3	2.1		90.2	81.9		.58	.45	
Spell.	I	16	18	1.4	0.9	NS	1.5	1.1	NS	81.6	76.5	NS	.50	.33	.05
	N	11	17	1.8	0.8		1.6	1.0		91.2	76.4		.91	.18	
	W	42	29	1.5	0.9		1.4	1.0		87.7	81.7		.54	.28	
Lang.	I	4	30	6.7	3.4	.05	6.3	3.5	.01	85.5	79.8	NS	.75	.33	.NS
	N	7	21	4.2	4.3		4.2	4.1		89.4	79.7		.57	.52	
	W	23	47	5.3	4.3		5.3	4.2		91.6	83.2		.70	.49	
6th Grade															
Read.	I	8	15	2.4	2.0	NS	2.7	2.4	NS	77.9	75.6	NS	.38	.27	NS
	N	3	12	2.1	2.0		1.9	2.2		85.7	78.7		.33	.25	
	W	23	34	2.9	2.3		2.7	2.4		85.2	82.7		.61	.35	
Arith.	I	6	17	2.4	1.9	NS	2.4	2.2	NS	83.5	73.9	NS	.83	.53	NS
	N	4	11	2.1	2.0		2.1	2.1		83.3	78.9		.50	.36	
	W	24	33	2.5	2.0		2.4	2.1		87.4	81.0		.61	.45	
Spell.	I	9	14	1.8	1.0	NS	2.0	1.3	NS	78.6	75.0	NS	.67	.36	NS
	N	5	10	1.8	0.9		1.7	1.1		86.2	77.0		.80	.10	
	W	33	25	1.7	1.1		1.5	1.1		85.4	80.1		.59	.32	
Lang.	I	4	19	6.7	3.4	.05	6.9	4.4	.05	80.8	75.5	NS	.75	.42	NS
	N	2	13	3.5	4.3		3.0	4.7		87.0	79.0		.00	.46	
	W	16	41	5.6	4.4		5.5	4.5		84.6	83.3		.81	.48	

TABLE XXXIII

MEAN SCORES OF GIRLS RECEIVING SATISFACTORY AND UNSATISFACTORY TEACHER MARKS

			Achievement		Adjusted Achievement		IQ		Achievement Group	
Subject	Mark	N	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.
4th and 6th Grade										
Read.	S	64	2.9	.01	2.9	.05	92.2	.01	.68	.01
	N	55	2.3		2.6		80.5		.24	
Arith.	S	57	2.4	.01	2.3	NS	93.3	.01	.67	.05
	N	62	2.0		2.2		81.4		.42	
Spell.	S	84	1.9	.01	1.9	.01	88.3	.05	.57	.05
	N	35	1.3		1.3		80.9		.30	
Lang.	S	55	5.8	.01	6.1	.01	94.0	.01	.73	.01
	N	64	4.6		4.8		82.4		.26	
6th Grade										
Read.	S	49	3.3	.01	2.8	NS	88.6	.01	.62	.01
	N	36	2.4		3.1		77.2		.20	
Arith.	S	43	2.5	.01	2.7	.01	89.1	.01	.58	NS
	N	42	2.1		2.2		74.9		.39	
Spell.	S	64	2.0	NS	2.1	NS	84.7	NS	.54	NS
	N	21	1.5		2.1		77.7		.56	
Lang.	S	37	6.8	.01	6.7	.01	87.1	NS	.53	NS
	N	48	4.9		5.3		79.2		.22	

As was expected, the girls receiving satisfactory marks obtained higher achievement scores than those with unsatisfactory marks. All the achievement differences as shown in Table XXXIII are significant at the .01 level. The null hypothesis 11:1 is rejected on all outcomes.

When achievement is adjusted for IQ, the mean mark differences are reduced in the areas of fourth and sixth grade reading and arithmetic, and sixth grade reading and spelling. The null hypothesis 11:2 is accepted for the outcome variables of fourth and sixth grade arithmetic, and sixth grade reading and spelling. The null hypothesis 11:2 is rejected for all outcome variables of fourth and sixth grade reading, spelling, and language, and for sixth grade arithmetic and language.

IQ differences favor the girls receiving satisfactory marks. When tested by the analyses of variance, the differences in mean scores were found to be significant at the .01 level for all fourth and sixth grade achievement variables, and for sixth grade reading and arithmetic. The null hypothesis 11:3 is rejected for all fourth and sixth grade outcome variables, and for sixth grade reading and arithmetic. The hypothesis is accepted for sixth grade spelling and language.

The mean achievement-group scores for high and low achieving girls show that more high achieving girls receive satisfactory marks in the fourth and sixth grade than girls in the sixth grade. The fourth and sixth grade score differences are all significant at either the .01 or .05 level, whereas the only sixth grade scores that are significant are the reading scores, at the .01 level. The null hypothesis 11:4 is rejected for all fourth and sixth grade outcome variables, and for sixth grade reading. It is accepted for sixth grade arithmetic, spelling, and language.

Hypothesis 12: Differences in Girls' Scores by Race: There are no significant differences in (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils between Indian, Negro, and white girls in:

a. reading
b. arithmetic
c. spelling
d. language.

Table XXXIV shows the mean scores of Indian, Negro, and white girls.

The achievement scores of Negro girls are lower in all cases than the scores of the other two racial groups. The scores of Indian and white

TABLE XXXIV

MEAN SCORES OF INDIAN, NEGRO, AND WHITE GIRLS

4th and 6th Grade										
			Achievement		Adjusted Achievement		IQ		Achievement Group	
Subject	Race	N	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.	$\bar{X}$	Sig.
Read.	I	28	3.1	NS	3.0	NS	87.5	NS	.47	NS
	N	18	2.2		2.6		82.8		.42	
	W	73	2.6		2.7		87.6		.47	
Arith.	I	28	2.4	NS	2.4	NS	87.5	NS	.62	NS
	N	18	2.1		2.1		82.8		.53	
	W	73	2.2		2.3		87.6		.49	
Spell.	I	28	1.7	NS	2.0	NS	87.5	NS	.56	NS
	N	18	1.6		1.6		82.8		.35	
	W	73	1.7		1.5		87.6		.39	
Lang.	I	28	5.6	NS	5.4	NS	87.5	NS	.51	NS
	N	18	4.7		5.3		82.8		.47	
	W	73	5.4		5.6		87.6		.50	
6th Grade										
Read.	I	20	2.9	NS	3.0	NS	84.0	.05	.44	NS
	N	9	2.6		3.3		77.9		.42	
	W	56	2.9		2.7		86.0		.41	
Arith.	I	20	2.4	NS	2.4	NS	84.0	.05	.62	NS
	N	9	2.1		2.2		77.9		.29	
	W	56	2.5		2.5		86.0		.41	
Spell.	I	20	2.1	NS	2.1	.05	84.0	.05	.53	NS
	N	9	2.0		2.6		77.9		.71	
	W	56	2.1		1.7		86.0		.40	
Lang.	I	20	5.9	NS	5.9	NS	84.0	.05	.49	NS
	N	9	5.2		6.0		77.9		.13	
	W	56	6.2		6.0		86.0		.52	

girls tend to run in a similar pattern. None of the differences were found to be significant. The null hypothesis 12:1 is accepted on all outcome variables.

Girls' scores for achievement when adjusted for IQ show a similar pattern trend, with the exception of sixth grade spelling, where Negro girls score significantly higher than the Indian or white girls. The null hypothesis 12:2 is accepted on all outcomes, except in sixth grade spelling, where it is rejected.

Indian and white fourth and sixth grade IQ scores are very much alike. Negro girls' scores are lower than the other two racial groups. The fourth and sixth grade differences are not statistically different. However, the sixth grade scores, which are lower within each racial group than the fourth and sixth grade scores, show a difference at the .05 level of significance. The null hypothesis 12:3 is accepted for the fourth and sixth grade, and is rejected for the sixth grade.

There are no consistent trends in the scoring patterns of high and low achieving groups. Differences were found to be non-significant. The null hypothesis 12:4 is accepted over all outcomes.

Hypothesis 13: Interaction of Girls' Race and Teacher Assessment: There are no measurable interactions of girls' racial background and teacher assessment associated with (1) mean achievement scores, (2) mean achievement scores adjusted for IQ, (3) mean IQ scores, and (4) mean achievement-group scores of high and low achieving pupils in:

a. reading
b. arithmetic
c. spelling
d. language.

The mean scores of Indian, Negro, and white girls receiving satisfactory and unsatisfactory teacher marks are presented in Table XXXV.

Indian, Negro, and white girls receiving satisfactory marks obtained higher achievement scores than girls receiving unsatisfactory marks. The differences were not found to be significant. The null hypothesis 13:1 is accepted on all outcomes. When achievement is adjusted for IQ, fourth and sixth grade reading scores are found to differ at the .05 level of significance. All of the other adjusted achievement differences were not found to be significant. The null hypothesis 13:2 is rejected for fourth and sixth grade reading, and is accepted for all other outcome variables.

TABLE XXXV

MEAN SCORES OF INDIAN, NEGRO, AND WHITE GIRLS RECEIVING SATISFACTORY AND UNSATISFACTORY TEACHER MARKS

4th and 6th Grade		N		Achievement			Adjusted Achievement			IQ			Achievement Group		
Subject	Race	S	N	$S\bar{X}$	$N\bar{X}$	Sig.	$S\bar{X}$	$N\bar{X}$	Sig.	$S\bar{X}$	$N\bar{X}$	Sig.	$S\bar{X}$	$N\bar{X}$	Sig.
Read.	I	18	10	2.9	2.9	NS	2.7	3.1	NS	91.6	80.9	NS	.55	.40	NS
	N	6	12	2.9	2.0		2.7	2.3		91.8	76.5		.67	.17	
	W	40	33	3.3	2.1		3.0	2.2		93.2	84.1		.75	.18	
Arith.	I	10	18	2.7	2.2	NS	2.5	2.2	NS	95.1	83.7	NS	.80	.44	NS
	N	5	13	2.1	2.0		1.9	2.2		91.0	77.9		.60	.46	
	W	42	31	2.7	1.9		2.5	2.0		93.8	82.7		.62	.35	
Spell.	I	22	6	2.0	1.9	NS	1.9	2.0	NS	89.9	80.0	NS	.64	.50	NS
	N	12	5	1.8	1.1		1.8	1.2		84.1	81.6		.50	.20	
	W	50	24	1.9	0.9		1.8	1.1		90.7	81.3		.58	.21	
Lang.	I	15	13	6.7	4.1	NS	6.9	3.9	NS	89.8	85.5	NS	.87	.15	NS
	N	3	15	6.3	4.5		6.3	4.9		97.7	78.3		.67	.27	
	W	37	36	6.5	4.8		6.5	5.0		94.5	83.5		.65	.35	
6th Grade															
Read.	I	11	9	3.1	2.7	NS	2.9	2.9	NS	87.6	80.4	NS	.55	.33	
	N	3	6	3.5	2.2		3.3	3.0		86.0	70.0		.66	.17	
	W	35	21	3.5	2.1		2.9	2.3		92.1	81.1		.71	.10	
Arith.	I	7	13	2.8	2.1	NS	2.6	2.2	NS	90.9	80.9	NS	.86	.38	NS
	N	4	6	2.1	2.1		2.0	2.4		84.3	71.3		.25	.33	
	W	32	24	2.8	2.1		2.5	2.1		92.1	82.5		.66	.38	
Spell.	I	15	5	2.2	1.7	NS	2.2	1.9	NS	86.5	78.2	NS	.67	.40	NS
	N	7	2	2.1	1.5		2.2	2.7		78.7	77.0		.43	1.00	
	W	42	15	2.7	1.4		1.8	1.4		89.1	77.8		.54	.27	
Lang.	I	9	11	7.6	4.2	NS	7.4	4.3	NS	87.3	82.0	NS	.89	.09	NS
	N	1	8	5.6	5.2		5.8	6.2		81.0	74.6		.00	.25	
	W	27	30	7.2	5.1		6.5	5.0		92.9	80.8		.70	.33	

IQ scores were higher for Indian, Negro, and white girls receiving satisfactory teacher marks than for those receiving unsatisfactory marks. The differences were found to be non-significant in all instances. The null hypothesis 13:3 is accepted on all outcomes.

There were more high achieving sixth grade girls receiving unsatisfactory teacher marks in arithmetic, spelling, and language, than those receiving satisfactory marks. The differences, however, were not found to be significant. The null hypothesis 13:4 is accepted on all outcomes.

Summary of the Findings

Sex and achievement

The main effect concerning sex differences in achievement scores was significant at the .01 level for fourth and sixth grade spelling, and for sixth grade spelling and language. Sex differences were significant at the .05 level for fourth and sixth grade reading, arithmetic, and language, and for sixth grade reading. They were not significant for sixth grade arithmetic. Girls' scores were higher on the average than boys' scores in all achievement areas.

Sex and adjusted achievement

The main effect concerning sex differences in achievement scores adjusted for IQ control was significant at the .01 level for spelling and language at both grade levels, and at the .05 level for fourth and sixth grade reading. Sex differences were not significant for adjusted fourth and sixth grade arithmetic scores, and sixth grade reading and arithmetic.

Sex and IQ; sex and achievement-group

The main effect concerning sex differences in IQ scores and sex differences in mean achievement-group scores of high and low achieving pupils was not significant in any instance.

Teacher assessment and achievement

The main effect concerning differences in teacher assessment of achievement was found to be significant at the .01 level in each of the four achievement areas analyzed. The scores of pupils receiving satisfactory teacher marks were higher than of those receiving unsatisfactory marks.

Teacher assessment and adjusted achievement

The main effect concerning differences in teacher assessment of achievement scores adjusted for IQ were significant at the .01 level for reading, spelling, and language, and at the .05 level for arithmetic at both grade levels.

Teacher assessment and IQ

The main effect concerning differences in teacher assessment in IQ scores was significant at the .01 level in all subjects in the fourth and sixth grade, and in reading and arithmetic in the sixth grade. Sixth grade spelling and language differences were significant at the .05 level.

Teacher assessment and achievement-group

The main effect concerning differences in teacher assessment of high and low achieving pupils was significant at the .01 level for all subjects in the fourth and sixth grade, and for sixth grade reading. Sixth grade arithmetic was found to be significant at the .05 level. No significant differences in teacher assessment of high and low achieving pupils were found in sixth grade spelling and language.

Race and achievement; race and adjusted achievement

The main effect concerning differences in race of children in achievement scores was found to be non-significant at both grade levels, and in all academic subjects studied. This was also the finding for the differences in race of children in achievement scores adjusted for IQ, and for achievement-group scores of high and low achieving children.

Race and IQ

The main effect concerning differences in race of children in IQ scores was found to be significant at the .05 level. IQ scores of Indian and Negro children were alike and lower than IQ scores of white children. For all three racial groups IQ scores were lower in the sixth grade than in the fourth and sixth grade.

Sex and teacher assessment; sex and race

The interaction of children's sex and teacher assessment was found to be non-significant in all instances. This was also the finding for the interaction of children's sex and race.

Race and teacher assessment

The interaction of children's race and teacher assessment was found to be non-significant in all instances, with the exception of achievement differences in language. The level of significance in this achievement area was .05.

The interaction of children's race and teacher assessment on achievement adjusted for IQ was found to be significant at the .01 level in language, and non-significant in the other areas studied.

The interaction of children's race and teacher assessment were not found to be significant on IQ scores, or on achievement-group scores of high and low achieving pupils.

Teacher assessment and boys' achievement

The main effect concerning differences in teacher assessment of boys in achievement scores was found to be significant at the .01 level in fourth and sixth grade spelling and language, and in sixth grade spelling. The differences were significant at the .05 level for fourth and sixth grade reading and arithmetic, and for sixth grade arithmetic and language. No significant differences in teacher assessment of satisfactory and unsatisfactory pupils were found in sixth grade reading.

Teacher assessment and boys' adjusted achievement

The main effect concerning differences in teacher assessment of achievement when adjusted for IQ was found to be significant at the .01 level for boys' spelling and language at both grade levels. Non-significant teacher assessment differences were found in reading and arithmetic at both grade levels.

Teacher assessment and boys' IQ

The main effect concerning differences in teacher assessment of IQ scores of boys was found to be significant at the .01 level in fourth and sixth grade arithmetic, and sixth grade reading and arithmetic. The level of significance was found to be .05 for fourth and sixth grade reading and sixth grade spelling. No significant differences were found for fourth and sixth grade spelling and language, and for sixth grade language.

Teacher assessment and boys' achievement-groups

The main effect concerning differences in teacher assessment of high and low achieving pupils was found to be significant at the .01 level for spelling, and non-significant in all other areas. Thus, although achievement scores were found to differ significantly in almost every subject studied, teachers did not mark high and low achieving boys in a significantly different manner in many instances.

Race and boys' achievement; race and boys' adjusted achievement

The main effect concerning boys' race in achievement scores was found to be non-significant on all outcomes. This was also found to be true for achievement scores adjusted for IQ, and for achievement-group scores of high and low achieving boys.

Race and boys' IQ

A .05 level of significance was found in the main effect of race on fourth and sixth grade IQ scores. Indian boys obtained the lowest IQ scores, followed in order by Negro and white boys. No significant differences in boys' IQ scores were found in the sixth grade.

Race and teacher assessment of boys' achievement

The interaction of boys' race and teacher assessment on boys' achievement scores was found to be non-significant in reading, arithmetic, and spelling for the fourth and sixth grade, and in all achievement areas in the sixth grade. Language differences were significant at the .05 level, with Negro boys receiving the lowest language scores.

Race and teacher assessment of boys' adjusted achievement

The interaction of boys' race and teacher assessment on boys' adjusted achievement scores resulted in non-significant differences in reading, arithmetic, and spelling at both grade levels. Language differences were significant at the .01 level in the fourth and sixth grade, and at the .05 level in the sixth grade.

Race and teacher assessment and boys' IQ

The interaction of boys' race and teacher assessment on boys' IQ scores in the four subject areas studied was found to be non-significant.

Race and teacher assessment of achievement-group

The interaction of boys' race and teacher assessment on achievement-group scores of high and low achieving boys was found to be non-significant in all instances, with the exception of fourth and sixth grade spelling, where the level of significance was .05.

Teacher assessment and girls' achievement

The main effect concerning differences in teacher assessment of girls' achievement scores was found to be significant at the .01 level on all outcomes. Girls receiving satisfactory teacher marks scored higher than those receiving unsatisfactory marks.

Teacher assessment and girls' adjusted achievement

The main effect concerning differences in teacher assessment of girls achievement scores was diminished when achievement was adjusted for IQ. The effect was found to be significant at the .01 level in fourth and sixth grade spelling and language, and in sixth grade arithmetic and language. The level of significance was .05 for fourth and sixth grade reading, and was found to be non-significant for fourth and sixth grade reading and spelling.

Teacher assessment and girls' IQ

The main effect of differences in teacher assessment of girls on IQ scores was found to be significant at the .01 level in fourth and sixth grade reading, arithmetic, and language, and sixth grade reading and arithmetic. Spelling differences were at the .05 level of significance.. No significant differences were found for sixth grade spelling and language.

Teacher assessment and achievement-group

The main effect concerning differences in teacher assessment of high and low achieving girls was found to be significant at the .01 level for fourth and sixth grade reading and language, and for sixth grade reading. Fourth and sixth grade reading and language were significant at the .05 level. No significant differences in teacher marking habits of high and low achieving girls were found in arithmetic, spelling, and language.

Race and girls' achievement

The main effect concerning differences of girls' race on achievement scores was found to be non-significant in all instances. The same finding is true for achievement-group scores of high and low achieving Indian, Negro, and white girls.

Race and girls' adjusted achievement

The main effect concerning differences for girls' race on adjusted achievement scores was non-significant in all instances with the exception of sixth grade spelling, which was significant at the .05 level.

Race and girls' IQ

The main effect of differences of girls' race on IQ scores was found to be non-significant for the fourth and sixth grade, and significant at the .05 level for the sixth grade girls. Negro girls scored lowest in IQ, followed in order by Indian and white girls.

Race and teacher assessment of girls

The interaction of girls' race and teacher assessment was not found to be significant in any instance in any of the subject areas investigated.

Summary

In the first part of Chapter III the results from the analyses of variance and covariance were discussed. Each hypothesis was examined and the levels of significance obtained from the analyses were presented. A summary of the findings concluded the chapter.

CHAPTER IV

SUMMARY AND CONCLUSIONS

Summary and Findings

The purpose of this study was to investigate the relationship of achievement marks assigned by teachers to elementary grade, lower socio-economic status boys and girls to pupils' (1) racial background, (2) sex, (3) IQ scores, and (4) tested achievement. The rationale behind this study was to inquire whether characteristics of the teachers' marking habits were relevant factors in the child's success pattern in school.

A pupil sample of 251 subjects and a teacher sample of 18 subjects were chosen from five fourth grade and 13 sixth grade classrooms in five selected inner-city schools of Special School District Number 1, Minneapolis, Minnesota. The pupil sample consisted of 132 boys and 119 girls. There were 62 Indian, 46 Negro, and 143 white children in the sample, all of whom had been enrolled in the Minneapolis Public Schools during the 1967-68 academic year. The teacher sample consisted of nine male and nine female white teachers.

Data on achievement in reading, spelling, language, and arithmetic were collected from scores on the Iowa Tests of Basic Skills, which had been administered during the end of January. Teachers' marks on these same academic subjects were obtained from winter-term school report cards.

The children were categorized by sex, racial background (American Indian, Negro, and white), and teacher assessment of achievement (satisfactory and not satisfactory). These three factors resulted in a three way analysis of variance and a three way analysis of covariance. The first two factors, sex and race, were crossed, and the third factor, teacher assessment, was nested within the combination of the other factors. The design selected led to the statement of thirteen hypotheses, each divided into four sections, for each of the four achievement variables (reading, arithmetic, spelling, and language) studied. The statistical analysis was performed with two sets of data, the fourth and sixth grades combined, and the sixth grade alone.

Achievement

Sex differences in achievement test scores were found in all four subject areas for the fourth and sixth grade, and in reading, spelling, and language for the sixth grade. Girls were found to obtain significantly higher marks than boys. Significant differences at the .01 level were found in achievement scores between pupils marked satisfactory and those marked unsatisfactory by teachers in all four subject areas for boys and for girls. There were no significant differences in achievement scores between Indian, Negro, and white pupils in any achievement area. The interactions of sex and teacher assessment, and of sex and race, provided no significant differences in achievement test scores. The only achievement area to be affected by the interaction of race and teacher assessment was boys' language. At both grade levels, language differences were significant at the .05 level. No significant differences were found in the interaction of sex, teacher assessment, and race.

Achievement Scores Adjusted for IQ

An analysis of covariance was used to adjust tested achievement scores so that IQ could be controlled. This resulted in fewer sex differences in achievement. Differences in pupils fourth and sixth grade reading, spelling, and language scores, and sixth grade spelling and language scores were found to be statistically significant. Pupils receiving satisfactory teacher marks obtained significantly higher scores than those receiving unsatisfactory marks. There were no differences in achievement between racial groups. Sixth grade girls' spelling scores were found to be significant at the .05 level, with Negro girls scoring highest, and white girls scoring lowest. There were no significant differences in the interactions of sex and marks, and of sex and race. With IQ controlled, the interaction of race and teacher assessment resulted in boys' language scores that were significant at the .01 level. The interaction of sex, teacher assessment, and race was significant at the .05 level for fourth and sixth grade reading.

IQ

No significant differences were found in IQ between boys and girls. Pupils receiving satisfactory teacher marks had significantly higher IQ scores than those receiving unsatisfactory marks. The levels of significance were .01 for all achievement areas for the fourth and sixth grade, and at the .05 level for spelling and language. There were no significant differences in IQ scores between boys receiving satisfactory teacher marks and those receiving unsatisfactory marks in reading and language at both grade levels. There were no significant differences in sixth grade girls' IQ scores between those receiving satisfactory teacher marks and those receiving unsatisfactory marks in spelling and language. IQ differences between races were significant at the .05 level. The IQ scores of fourth and sixth grade boys indicated that Indian boys scored lowest, followed in order by Negro boys, then white boys. There were no significant differences by race for sixth grade boys, or for fourth and sixth grade girls. However, the IQ scores of sixth grade girls were significantly different, showing that Indian girls scored lowest, followed by Negro, then white girls. No significant differences were found in any achievement area for the interaction of sex and teacher assessment, sex and race, race and teacher assessment, or sex, teacher assessment and race.

Achievement-Group Scores of High and Low Achieving Pupils

Pupils were assigned to high or low achievement groups according to whether they placed above or below their grade median in a particular achievement test. No significant differences were found between sexes in the achievement group scores of high and low achieving pupils. That is, there were no differences between the number of boys and of girls in the high achieving group, and between the number of boys and of girls in the low achieving group. In the fourth and sixth grade, significant differences were found at the .01 level between pupils receiving satisfactory teacher marks and those receiving unsatisfactory marks. However, progressing to the sixth grade, fewer significant differences were found. There were no differences in teacher assessment of sixth grade spelling and language, indicating that high and low achieving pupils did not necessarily receive satisfactory teacher marks, and that low achieving pupils did not necessarily receive unsatisfactory teacher marks. The only significant difference in achievement group scores for boys was in the area of spelling. There were no significant differences in reading, arithmetic, or language achievement scores at both grade levels. This was quite unexpected, since all boys' achievement test scores, except sixth grade arithmetic, had been found to be significantly different. Teacher marking habits for girls differed from those for boys. All fourth and sixth grade achievement-group scores were significantly different. Yet, girls' sixth grade arithmetic, spelling and language scores were found to be non-significant. Sixth grade teachers did not assign satisfactory and unsatisfactory marks to high and low achieving girls in the same manner as did the fourth and sixth grade teachers. There were no significant differences in achievement group scores between racial groups, except in the case of sixth grade language, where the level of significance was .05, indicating very few high achieving Negro pupils. There were no significant differences in achievement group scores in the interactions of sex and teacher assessment, sex and race, and sex, teacher assessment, and race for all boys and girls. The interaction of fourth and sixth grade boys' race and teacher assessment was found to be significant at the .05 level for spelling.

Cautions in Interpreting the Findings

Before drawing any conclusions about the findings of this study several limitations must be noted so that interpretations are made cautiously and wisely.

The pupil and teacher samples were not randomly selected. Because of the requirements of the design, only schools with Indian, Negro, and white children in attendance were employed in this study. Certain unusual characteristics of the five selected schools and their occupants might affect the results, and might differ from characteristics of other inner-city schools which do not have the three races in attendance. The pupil and teacher samples, then, had to be selected from these five particular schools. In order to generalize the findings, one would have to ascertain that another population and other schools being described were of a nature similar to the ones in the present study.

The validity of the findings depends on the reliability and validity of the instruments used. The measuring instruments described in this study were normed on a general population of school children, not on deprived or lower socio-economic level populations. Thus, the results of the intelligence and achievement tests used might very well not reflect the actual intellectual or ability levels of the disadvantaged sample in this investigation.

The use of S-N marking and simply dichotomizing on tested achievement allows only gross comparisons. That is, "extremes" are compared via S and N; no shading that might reveal subtle discrimination if any exists is shown. In addition, cutting the achievement scores in half means that the means will probably show big separation but the distribution won't, raising the question about "real" differences in test scores.

The number in the pupil sample is small. A substantial number of analyses were run on this relatively small sample. Recorded data were examined in several ways to determine the various outcomes being investigated. The author does not assume that these results and findings should be applied to all disadvantaged children, or to all Indian, Negro, and white children, or to all fourth and sixth grade teachers.

Conclusions

Keeping in mind the scope of the above mentioned limitations, the following conclusions may be stated.

Differences in achievement scores exist between low socio-economic status boys and girls in reading, arithmetic, spelling and language. Girls obtain higher scores than do boys.

When achievement scores are adjusted for IQ, the above-mentioned conclusion may again be stated.

Differences in achievement scores exist in teacher assessment of low socio-economic status pupils marked satisfactory and in those marked unsatisfactory.

Differences in IQ scores exist between low socio-economic status pupils receiving satisfactory teacher marks and those receiving unsatisfactory marks.

Differences do not exist between low socio-economic status boys and girls in achievement group scores. The proportion of high and low achieving boys is similar to the proportion of high and low achieving girls.

Differences in achievement group scores exist between children receiving satisfactory teacher marks and those receiving unsatisfactory teacher marks. Progressing from the fourth and sixth grade combination, to the sixth grade alone, it was found that there is less differentiation in teacher assessment of high and low achieving pupils.

Differences in achievement group scores do not exist between Indian, Negro and white pupils, with the one exception of teacher assessment of language skills.

Implications of the Study

The conclusions reached in the previous section lead this author to make the following comments and suggestions.

One implication for education which becomes apparent from this study is that boys and girls ought to be presented with and involved in different, or separate, or adjusted curricular programs and materials, designed to allow both sexes to develop to their highest potential. The learning style of boys and teacher behavior toward boys must be examined to determine what techniques are most suitable for the production of achievement results comparable to the girls. Boys appear to suffer most in the area of language achievement.

A second implication is a result of the findings that the achievement scores for all three racial groups throughout the four academic subjects studied are very low. These scores may be a factor of any of the following: inadequate measuring instruments; the inability of inner-city children to master the techniques of test-taking; a demonstration of the "self-fulfilling prophecy of non-learning;" negative teacher attitudes toward the lower social classes in general; negative children's attitudes toward learning and/or teachers; or of the intellectual inability of children of certain lower social-economic status families to perform in the expected manner in academic areas. In each academic subject the growth in achievement scores for the children in this sample from fourth to sixth grade was a year or less. The cumulative deficit theory is supported by this investigation.

A third implication of the study comes from the finding that with socio-economic level held constant, Indian, Negro, and white children's achievement scores do not differ significantly. There was no evidence in this study that the two minority groups, Indian and Negro, were inferior in their academic capacities to the white sample, despite significant tested IQ differences. These IQ differences might be a result of the fact that there were more white children in Class V of the occupational scale than Indian or Negro children proportionately, and the IQ difference results from socio-economic differences rather than racial differences. This perhaps implies that in studies where racial differences in achievement and IQ are found, the samples were not well enough controlled for socio-economic level and environmental differences.

A fourth implication for educators which emerges from this study is that teachers' marking habits are not consistent. Despite significant achievement and IQ differences, the teachers in this study in many instances marked the high and low achieving pupils in such a way as to fail to distinguish between high and low achievers. The marking practices of teachers then must be carefully considered and evaluated, so that teachers do not become negative influences on pupil academic behavior. Especially important is that as children grow older teachers do not seem to be as aware of achievement differences as they are in the lower grades.

A fifth implication of the study is that one popular reason for explaining poor academic results in inner-city schools, middle-class white teachers' bias against lower-class minority races, is not supported by the evidence of this investigation.

Recommendation for Further Study

The findings and conclusions of this investigation lead to areas for further research.

A primary need is to create valid and reliable instruments of measurement that have been standardized on the population that is to be studied. It is not useful nor scientific to state results of studies on lower socio-economic status children, when they have been tested on standardized tests that have been normed on middle-class or advantaged populations.

Testing procedures and methods adapted to the many different types and classes of children in the United States must be developed to insure reliable measures. Children whose language abilities are not adequate are especially vulnerable to the types of standardized testing materials presently available.

Research on sex differences of disadvantaged youth is needed. Should boys and girls be segregated in the elementary school? Should boys be encouraged to start their formal academic work later than girls? What type of programs and teaching techniques will enable boys to use their skills to the greatest advantage?

A research study similar to the one presented here could be carried out on race differences in the early primary grades to investigate whether or not there are any differences between racial groups such as the Indian, Negro, and white children studied.

Consistent and accelerated research on programs of teacher education should include close study of marking procedures and techniques. Instruments to measure bias in marking habits could be developed to indicate to future teachers how the unseen dangers of emotional bias or racial prejudice might negatively influence their marking practices.

A longitudinal study following the same group of Indian, Negro, and white children through their elementary school years might illustrate how the many teachers they encounter affect their academic success in school by their classroom behaviors and marking practices.

Research of the type that will point out more precisely what factors actually influence teachers in their marking practices is needed. The present investigation revealed no teacher bias against a particular racial group. However, the problem of minority group and racial differences is not as severe in the community studied as it is in other parts of the country. Would a research study to investigate exactly the same topics studied here, performed in New York, or Detroit, or Los Angeles, arrive at similar conclusions?

Summary

This chapter presented a summary of the study and findings related to achievement, achievement scores adjusted for IQ, IQ, and achievement-group scores were restated. Limitations of the study and cautions in interpreting the results were discussed. Conclusions were drawn, and implications of the study, and areas for further study completed the chapter.

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Appendix A

Minneapolis Public Schools Report Card

EXPLANATION OF MARKS

S—SATISFACTORY PROGRESS: progress is satisfactory according to his ability.

N—NEEDS TO WORK HARDER: progress is not satisfactory according to his ability.

Your child's teacher has used standardized tests, teacher-made tests, and observation as the basis for these marks. If you wish to have more information, make arrangements to talk with the teacher.

☐ EXCHANGE OF INFORMATION is enclosed.

KNOWLEDGES AND SKILLS

	Period 1	2	3
SOCIAL STUDIES			
Finds and uses suitable reference material			
Interprets maps, globes, charts			
Draws conclusions			
Takes part in class discussions			
SCIENCE			
Shows interest			
Draws conclusions from reading and observation			
READING			
Reads with understanding			
Uses word recognition skills			
Uses basic study skills			
Reads widely			
LANGUAGE			
Listens attentively			
Expresses ideas well orally			
Expresses ideas well in writing			
Uses language skills in writing			
Shows growth in spelling			
Writes legibly and neatly			
ARITHMETIC			
Knows arithmetic facts			
Uses processes of addition, subtraction, multiplication, division			
Solves problems			
ART			
MUSIC			
PHYSICAL EDUCATION			

Appendix B

TEACHER QUESTIONNAIRE

Directions

An attempt is being made to determine what factors teachers consider important when they are assigning achieved grade-level marks to children on school subjects. Below are listed some of the more frequently mentioned factors.

1. Please estimate what percent each of the four major factors listed influence your grades. Notice that the total must add up to 100 percent.
2. There are several sub-sections for each major category. Estimate by percent which of these factors influence your marks. Note that the sum of the sub-categories must equal the percentage of the major category.

   Example: If a teacher estimated that work habits of a child influenced his marks about 25 percent, and that class participation was the major sub-factor, he might fill in the blanks in the following manner:

   25 % Work Habits

   - 18 % Class participation
   - 5 % Use of study time
   - 1 % Accuracy
   - 1 % Neatness
   - 0 % Other (Notice that 18+5+1+1 = 25)

The success of a questionnaire depends on honest answers. Please be frank. Your responses will be held in strict confidence and will not be disclosed by name to anyone.

Thank you.

Name______________________________

Grade Taught_______________________

FACTORS CONSIDERED FOR ASSIGNING GRADE-LEVEL MARKS
(i.e., at-, above-, or below-grade level)

____% Work Habits

- ____% Participation in Class
- ____% Use of Study Time
- ____% Accuracy
- ____% Neatness
- ____% Other (specify)______________________________

____% Adjustment with Others

- ____% Cooperation
- ____% Displays Leadership
- ____% Thoughtfulness
- ____% Respects Authority
- ____% Other (specify)______________________________

____% Behavior Traits

- ____% Dependability
- ____% Initiative
- ____% Courtesy
- ____% Distractability
- ____% Other (specify)______________________________

____% Achievement

- ____% Scores on Teacher Made Tests
- ____% Standardized Achievement Test Scores
- ____% Classroom Assignments
- ____% Homework Assignments
- ____% Other (specify)______________________________

100 % Total

Appendix C

PLEASE RETURN IN THE ENCLOSED ENVELOPE AS SOON AS POSSIBLE

Directions to the Teacher for Family Information Sheet

School records are incomplete for many children on parental occupations. The following questionnaire has been designed to augment this information. It is requested that the children not be informed that this is a quiz or questionnaire. The children should be instructed that we, the school, and a lady doing a research project at the University, want to know how much boys and girls know about their families. If you are aware of any situation such as unemployed, disabled, or welfare, please note on the paper.

I know how busy you are at this time of year. Your efforts and cooperation are most appreciated. Thank you for all your help.

(Mrs.) Enrica Fish

N. B. In the lower left-hand corner of the Family Information Sheet are the symbols N (Negro), I (Indian), and W (White). Would you please circle the appropriate symbol, so as to indicate the child's race.

Name ____________________

Grade ____________________

FAMILY INFORMATION SHEET

1. What color eyes does your mother have? ____________________
2. What is her favorite food? ____________________
3. What is your favorite TV program? ____________________
4. How many brothers do you have? ____________________
5. How many sisters do you have? ____________________
6. Does anyone in your family have a hobby? ____________________

   ____
7. Who earns the money in your family? ____________________
8. What is the name of this person's job? ____________________

   ____
9. Describe the kind of work this is. ____________________

   ____

   ____

   ____
10. What kind of tools are used in this job? ____________________

    ____
11. Where were your parents born? ____________________
12. Does your family like to fish or hunt? ____________________

    ____
13. Where do you spend the summer? ____________________

    ____

Appendix D

Analyses of Variance and Covariance Tables

TABLE XXXVI

ANALYSIS OF VARIANCE OF READING SCORES FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

4th and 6th Grade Source of Variation		df	Sum of Squares	Mean Square	F Ratio	Significance
Sex		1	748.510	748.510	6.363	.05
Marks		1	1690.876	1690.876	14.373	.01
Race		2	189.251	92.126	.804	n.s.
Sex X Marks		1	34.633	34.633	.294	n.s.
Sex X Race		2	329.458	164.729	1.400	n.s.
Marks X Race		2	224.397	112.199	.954	n.s.
Sex X Marks X Race		2	537.868	268.934	2.286	n.s.
Error		239	28116.689	117.643		
Marks	(Boys)	1	667.577	667.577	5.847	.05
Race	(Boys)	2	290.793	145.397	1.273	n.s.
Marks X Race	(Boys)	2	52.561	26.282	.230	n.s.
Error	(Boys)	126	14386.324	114.177		
Marks	(Girls)	1	1032.353	1032.353	8.496	.01
Race	(Girls)	2	210.979	105.490	.868	n.s.
Marks X Race	(Girls)	2	710.297	355.149	2.923	n.s.
Error	(Girls)	113	13730.365	121.507		
6th Grade						
Sex		1	828.411	828.411	6.599	.05
Marks		1	1039.252	1039.252	8.279	.01
Race		2	104.686	52.343	.417	n.s.
Sex X Marks		1	242.259	242.259	1.930	n.s.
Sex X Race		2	256.234	128.117	1.021	n.s.
Marks X Race		2	168.004	84.002	.669	n.s.
Sex X Marks X Race		2	163.854	81.927	.653	n.s.
Error		168	21089.778	125.534		
Marks	(Boys)	1	148.885	148.885	1.342	n.s.
Race	(Boys)	2	356.912	178.456	1.609	n.s.
Marks X Race	(Boys)	2	31.419	15.710	.142	n.s.
Error	(Boys)	89	9871.865	110.919		
Marks	(Girls)	1	1071.327	1071.327	7.545	.01
Race	(Girls)	2	22.033	11.027	.076	n.s.
Marks X Race	(Girls)	2	295.086	147.543	1.039	n.s.
Error	(Girls)	79	11217.912	141.999		

$F_{.99}$ (1, ∞ df) = 6.63; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.61; $F_{.95}$ (2, ∞ df) = 3.00

TABLE XXXVII

ANALYSIS OF VARIANCE OF ARITHMETIC SCORES FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	Significance
4th and 6th Grade					
Sex	1	305.241	305.241	5.034	.05
Marks	1	554.460	554.460	9.145	.01
Race	2	247.468	123.734	2.041	n.s.
Sex X Marks	1	19.334	19.334	.319	n.s.
Sex X Race	2	166.577	83.289	1.374	n.s.
Marks X Race	2	199.093	99.547	1.642	n.s.
Sex X Marks X Race	2	55.863	27.932	.461	n.s.
Error	239	14712.593	61.559		
Marks (Boys)	1	225.330	225.330	4.056	.05
Race (Boys)	2	292.592	146.296	2.634	n.s.
Marks X Race (Boys)	2	34.093	17.047	.307	n.s.
Error (Boys)	126	6943.554	55.108		
Marks (Girls)	1	481.352	481.352	7.063	.01
Race (Girls)	2	73.756	36.878	.541	n.s.
Marks X Race (Girls)	2	92.553	46.277	.679	n.s.
Error (Girls)	113	7769.044	68.752		
6th Grade					
Sex	1	130.143	130.143	2.184	n.s.
Marks	1	671.566	671.566	11.268	.01
Race	2	104.113	52.057	.873	n.s.
Sex X Marks	1	21.850	21.850	.367	n.s.
Sex X Race	2	25.538	12.769	.214	n.s.
Marks X Race	2	48.682	24.341	.408	n.s.
Sex X Marks X Race	2	2.755	1.778	.023	n.s.
Error	168	10012.487	59.002		
Marks (Boys)	1	237.760	237.760	4.306	.05
Race (Boys)	2	80.179	40.090	.726	n.s.
Marks X Race (Boys)	2	30.829	15.415	.279	n.s.
Error (Boys)	89	4858.548	54.580		
Marks (Girls)	1	445.031	445.031	6.908	.01
Race (Girls)	2	49.971	24.986	.388	n.s.
Marks X Race (Girls)	2	21.455	10.728	.167	n.s.
Error (Girls)	79	5153.939	65.299		

$F_{.99}$ (1, ∞ df) = 6.63; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.61; $F_{.95}$ (2, ∞ df) = 3.00

TABLE XXXVIII

ANALYSIS OF VARIANCE OF SPELLING SCORES FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

4th and 6th Grade

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	652.437	652.437	9.792	.01
Marks	1	1603.911	1603.911	24.071	.01
Race	2	152.481	76.241	1.144	n.s.
Sex X Marks	1	2.061	2.061	.031	n.s.
Sex X Race	2	254.551	127.276	1.910	n.s.
Marks X Race	2	189.833	94.917	1.424	n.s.
Sex X Marks X Race	2	160.073	80.037	1.201	n.s.
Error	239	15913.964	66.587		
Marks (Boys)	1	179.810	179.810	22.054	.01
Race (Boys)	2	24.543	12.272	.229	n.s.
Marks X Race (Boys)	2	88.830	44.415	.830	n.s.
Error (Boys)	126	6740.490	53.496		
Marks (Girls)	1	581.689	581.689	7.102	.01
Race (Girls)	2	321.787	160.889	1.964	n.s.
Marks X Race (Girls)	2	225.215	112.608	1.375	n.s.
Error (Girls)	113	9173.474	81.181		
6th Grade					
Sex	1	667.936	667.936	9.525	.01
Marks	1	520.539	520.539	7.423	.01
Race	2	302.305	151.153	2.156	n.s.
Sex X Marks	1	95.703	95.703	1.365	n.s.
Sex X Race	2	114.868	57.434	.819	n.s.
Marks X Race	2	41.002	20.501	.292	n.s.
Sex X Marks X Race	2	179.773	89.887	1.282	n.s.
Error	168	11710.719	69.706		
Marks (Boys)	1	985.504	985.504	16.949	.01
Race (Boys)	2	39.110	19.555	.336	n.s.
Marks X Race (Boys)	2	54.465	27.233	.468	n.s.
Error (Boys)	89	5174.872	58.144		
Marks (Girls)	1	41.867	41.867	.694	n.s.
Race (Girls)	2	294.120	147.060	1.755	n.s.
Marks X Race (Girls)	2	125.928	62.964	1.751	n.s.
Error (Girls)	79	6535.847	82.732		

$F_{.99}$ (1, ∞ df) = 6.63; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.61; $F_{.95}$ (2, ∞ df) = 3.00

TABLE XXXIX

ANALYSIS OF VARIANCE OF LANGUAGE SCORES FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

4th and 6th Grade Source of Variation		df	Sum of Squares	Mean Square	F Ratio	Significance
Sex		1	1924.159	1924.159	6.127	.05
Marks		1	9147.219	9147.219	29.127	.01
Race		2	371.634	185.817	.592	n.s.
Sex X Marks		1	301.720	301.720	.961	n.s.
Sex X Race		2	233.090	116.545	.371	n.s.
Marks X Race		2	2296.298	1148.149	3.656	.05
Sex X Marks X Race		2	607.298	303.649	.966	n.s.
Error		239	75370.636	315.358		
Marks	(Boys)	1	3231.187	3231.187	12.343	.01
Race	(Boys)	2	617.561	308.782	1.180	n.s.
Marks X Race	(Boys)	2	2341.234	1170.617	4.472	.05
Error	(Boys)	126	32984.872	261.784		
Marks	(Girls)	1	6070.136	6070.136	16.326	.01
Race	(Girls)	2	8.187	4.094	.022	n.s.
Marks X Race	(Girls)	2	329.069	164.535	.443	n.s.
Error	(Girls)	113	42385.764	375.095		
6th Grade						
Sex		1	2028.864	2028.864	6.738	.01
Marks		1	3659.604	3659.604	12.154	.01
Race		2	716.566	358.283	1.190	n.s.
Sex X Marks		1	270.407	270.407	.898	n.s.
Sex X Race		2	201.650	100.825	.335	n.s.
Marks X Race		2	2504.661	1252.331	4.159	.05
Sex X Marks X Race		2	65.517	32.759	.109	n.s.
Error		168	51137.513	304.389		
Marks	(Boys)	1	1180.299	1180.299	4.238	.05
Race	(Boys)	2	958.702	479.351	1.721	n.s.
Marks X Race	(Boys)	2	1686.251	843.126	3.027	.05
Error	(Boys)	89	25068.327	281.666		
Marks	(Girls)	1	2502.778	2502.778	7.680	.01
Race	(Girls)	2	214.617	107.309	.329	n.s.
Marks X Race	(Girls)	2	939.696	469.848	1.442	n.s.
Error	(Girls)	79	26069.186	329.989		

$F_{.99}$ (1, ∞ df) = 6.63; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.61; $F_{.95}$ (2, ∞ df) = 3.00

TABLE XXXX

ANALYSIS OF COVARIANCE OF READING SCORES ADJUSTED FOR IQ FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

Source of Variation		df	Sum of Squares	Mean Square	F Ratio	Significance
4th and 6th Grade						
Sex		1	352.706	352.706	3.537	n.s.
Marks		1	1280.703	1280.703	12.843	.01
Race		2	120.715	60.357	.605	n.s.
Sex X Marks		1	28.301	28.301	.284	n.s.
Sex X Race		2	189.978	94.989	.953	n.s.
Marks X Race		2	190.964	95.482	.956	n.s.
Sex X Marks X Race		2	743.535	371.768	3.728	.05
Error		238	23733.218	99.719		
Marks	(Boys)	1	338.742	338.742	3.586	n.s.
Race	(Boys)	2	140.349	70.175	.743	n.s.
Marks X Race	(Boys)	2	207.320	103.660	1.097	n.s.
Error	(Boys)	125	11807.553	94.460		
Marks	(Girls)	1	590.857	590.857	5.549	.05
Race	(Girls)	2	155.561	77.781	.730	n.s.
Marks X Race	(Girls)	2	793.222	396.611	3.725	.05
Error	(Girls)	112	11925.573	106.478		
6th Grade						
Sex		1	243.394	243.394	2.593	n.s.
Marks		1	662.978	662.978	7.062	.01
Race		2	46.715	23.357	.249	n.s.
Sex X Marks		1	43.097	43.097	.459	n.s.
Sex X Race		2	315.230	157.615	1.679	n.s.
Marks X Race		2	106.940	53.470	.570	n.s.
Sex X Marks X Race		2	102.475	51.237	.546	n.s.
Error		167	15677.397	93.877		
Marks	(Boys)	1	177.495	177.495	2.184	n.s.
Race	(Boys)	2	151.577	75.789	.933	n.s.
Marks X Race	(Boys)	2	79.251	37.125	.457	n.s.
Error	(Boys)	88	7151.957	81.272		
Marks	(Girls)	1	129.192	129.192	1.218	n.s.
Race	(Girls)	2	264.411	132.206	1.246	n.s.
Marks X Race	(Girls)	2	150.137	75.069	.708	n.s.
Error	(Girls)	78	8274.332	106.081		

$F_{.99}$ (1, ∞ df) = 6.64; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.60; $F_{.95}$ (2, ∞ df) = 2.99

TABLE XXXXI

ANALYSIS OF COVARIANCE OF ARITHMETIC SCORES ADJUSTED FOR IQ FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	Significance
4th and 6th Grade					
Sex	1	110.177	110.177	2.004	n.s.
Marks	1	253.932	253.932	4.619	.05
Race	2	143.566	71.783	1.306	n.s.
Sex X Marks	1	35.407	35.407	.644	n.s.
Sex X Race	2	75.043	37.522	.682	n.s.
Marks X Race	2	210.277	105.138	1.912	n.s.
Sex X Marks X Race	2	47.656	23.828	.433	n.s.
Error	238	13084.532	54.977		
Marks (Boys)	1	63.380	63.380	1.255	n.s.
Race (Boys)	2	157.699	78.849	1.561	n.s.
Marks X Race (Boys)	2	37.696	18.848	.373	n.s.
Error (Boys)	125	6314.942	50.520		
Marks (Girls)	1	164.431	164.431	2.732	n.s.
Race (Girls)	2	23.357	11.679	.194	n.s.
Marks X Race (Girls)	2	192.156	96.078	1.597	n.s.
Error (Girls	112	6739.873	60.177		
6th Grade					
Sex	1	33.459	33.459	.679	n.s.
Marks	1	315.940	315.940	6.410	.05
Race	2	34.433	17.216	.349	n.s.
Sex X Marks	1	6.767	6.767	.137	n.s.
Sex X Race	2	7.436	3.718	.075	n.s.
Marks X Race	2	88.353	44.176	.896	n.s.
Sex X Marks X Race	2	28.624	14.312	.290	n.s.
Error	167	8230.850	49.287		
Marks (Boys)	1	137.909	137.909	2.923	n.s.
Race (Boys)	2	28.319	14.160	.305	n.s.
Marks X Race (Boys)	2	14.670	7.335	.158	n.s.
Error (Boys)	88	4082.387	46.391		
Marks (Girls)	1	486.536	486.536	8.413	.01
Race (Girls)	2	55.736	27.868	.482	n.s.
Marks X Race (Girls)	2	115.049	57.525	.995	n.s.
Error (Girls)	78	4510.816	57.831		

$F_{.99}$ (1, ∞ df) = 6.64; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.60; $F_{.95}$ (2, ∞ df) = 2.99

TABLE XXXXII

ANALYSIS OF COVARIANCE OF SPELLING SCORES ADJUSTED FOR IQ FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

4th and 6th Grade Source of Variation		df	Sum of Squares	Mean Square	F Ratio	Significance
Sex		1	628.453	628.453	10.445	.01
Marks		1	1703.642	1703.642	28.315	.01
Race		2	105.905	52.952	.880	n.s.
Sex X Marks		1	15.897	15.897	.264	n.s.
Sex X Race		2	99.493	49.747	.827	n.s.
Marks X Race		2	59.150	29.575	.492	n.s.
Sex X Marks X Race		2	133.571	66.786	1.110	n.s.
Error		238	14380.101	60.168		
Marks	(Boys)	1	613.852	613.852	12.581	.01
Race	(Boys)	2	.744	.372	.008	n.s.
Marks X Race	(Boys)	2	30.714	15.357	.315	n.s.
Error	(Boys)	125	6147.991	48.794		
Marks	(Girls)	1	695.652	693.652	9.449	.01
Race	(Girls)	2	232.080	116.040	1.581	n.s.
Marks X Race	(Girls)	2	235.800	117.900	1.606	n.s.
Error	(Girls)	112	8222.283	73.413		
6th Grade						
Sex		1	558.769	558.769	10.694	.01
Marks		1	1138.893	1138.893	21.797	.01
Race		2	318.850	159.425	3.051	n.s.
Sex X Marks		1	23.256	23.256	.445	n.s.
Sex X Race		2	69.326	34.663	.663	n.s.
Marks X Race		2	72.142	36.071	.690	n.s.
Sex X Marks X Race		2	105.027	52.513	1.005	n.s.
Error		167	8778.028	52.250		
Marks	(Boys)	1	610.437	610.437	12.576	.01
Race	(Boys)	2	78.915	39.457	.813	n.s.
Marks X Race	(Boys)	2	52.949	26.474	.545	n.s.
Error	(Boys)	88	4320.128	48.541		
Marks	(Girls)	1	81.003	81.003	1.474	n.s.
Race	(Girls)	2	486.144	243.072	4.423	.05
Marks X Race	(Girls)	2	51.751	25.876	.471	n.s.
Error	(Girls)	78	4286.159	54.951		

$F_{.99}$ (1, ∞ df) = 6.64; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.60; $F_{.95}$ (2, ∞ df) = 2.99

TABLE XXXXIII

ANALYSIS OF COVARIANCE OF LANGUAGE SCORES ADJUSTED FOR IQ FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

4th and 6th Grade Source of Variation		df	Sum of Squares	Mean Square	F Ratio	Significance
Sex		1	3523.192	3523.192	13.007	.01
Marks		1	7390.600	7390.600	27.285	.01
Race		2	609.172	304.586	1.124	n.s.
Sex X Marks		1	210.998	210.998	.779	n.s.
Sex X Race		2	405.963	202.982	.749	n.s.
Marks X Race		2	4645.791	2322.896	8.576	.01
Sex X Marks X Race		2	18.075	9.038	.033	n.s.
Error		238	64466.910	270.869		
Marks	(Boys)	1	1489.629	1489.629	6.679	.01
Race	(Boys)	2	432.304	216.102	.969	n.s.
Marks X Race	(Boys)	2	2894.742	1447.371	6.489	.01
Error	(Boys)	125	27880.573	223.045		
Marks	(Girls)	1	3939.331	3939.331	11.488	.01
Race	(Girls)	2	236.340	118.170	.345	n.s.
Marks X Race	(Girls)	2	1004.150	502.075	1.464	n.s.
Error	(Girls)	112	38406.524	342.915		
6th Grade						
Sex		1	1729.789	1729.789	8.161	.01
Marks		1	8715.438	8715.438	41.117	.01
Race		2	28.142	14.071	.066	n.s.
Sex X Marks		1	184.230	184.230	.869	n.s.
Sex X Race		2	1020.887	510.443	2.408	n.s.
Marks X Race		2	3373.933	1686.967	7.959	.01
Sex X Marks X Race		2	27.186	13.593	.064	n.s.
Error		167	35398.621	211.968		
Marks	(Boys)	1	2126.787	2126.787	10.319	.01
Race	(Boys)	2	172.106	86.053	.418	n.s.
Marks X Race	(Boys)	2	1793.785	896.892	4.351	.05
Error	(Boys)	88	18136.946	206.101		
Marks	(Girls)	1	5491.662	5491.662	22.560	.01
Race	(Girls)	2	117.445	58.722	.242	n.s.
Marks X Race	(Girls)	2	1288.300	644.150	2.651	n.s.
Error	(Girls)	78	19196.855	242.998		

$F_{.99}$ (1, ∞ df) = 6.64; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.60; $F_{.95}$ (2, ∞ df) = 2.99

TABLE XXXXIV

ANALYSIS OF VARIANCE OF IQ SCORES FOR THE VARIABLE READING FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

Source of Variation		df	Sum of Squares	Mean Square	F Ratio	Significance
4th and 6th Grade						
Sex		1	387.818	387.818	3.117	n.s.
Marks		1	309.750	309.750	24.892	.01
Race		2	974.705	487.353	3.916	.05
Sex X Marks		1	417.076	417.076	3.352	n.s.
Sex X Race		2	414.795	207.398	1.667	n.s.
Marks X Race		2	365.383	182.697	1.468	n.s.
Sex X Marks X Race		2	103.240	51.620	.415	n.s.
Error		239	29740.749	124.438		
Marks	(Boys)	1	667.479	667.479	4.776	.05
Race	(Boys)	2	1067.659	533.829	3.820	.05
Marks X Race	(Boys)	2	357.631	178.816	1.279	n.s.
Error	(Boys)	126	17610.046	139.762		
Marks	(Girls)	1	2704.270	2704.270	25.191	.01
Race	(Girls)	2	307.139	153.569	1.431	n.s.
Marks X Race	(Girls)	2	128.429	64.215	.598	n.s.
Error	(Girls)	113	12130.703	107.351		
6th Grade						
Sex		1	89.542	89.542	.810	n.s.
Marks		1	1454.237	1454.237	13.155	.01
Race		2	912.743	456.372	4.128	.05
Sex X Marks		1	347.628	347.628	3.145	n.s.
Sex X Race		2	416.950	208.475	1.886	n.s.
Marks X Race		2	139.778	69.839	.632	n.s.
Sex X Marks X Race		2	27.021	13.512	.122	n.s.
Error		168	18572.160	110.548		
Marks	(Boys)	1	203.443	203.443	1.424	n.s.
Race	(Boys)	2	781.543	390.772	2.734	n.s.
Marks X Race	(Boys)	2	44.553	22.277	.156	n.s.
Error	(Boys)	89	12718.554	142.905		
Marks	(Girls)	1	1511.496	1511.496	20.399	.01
Race	(Girls)	2	528.909	264.455	3.569	.05
Marks X Race	(Girls)	2	119.143	59.572	.804	n.s.
Error	(Girls)	79	5853.606	74.096		

$F_{.99}$ (1, ∞ df) = 6.63; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.61; $F_{.95}$ (2, ∞ df) = 3.00

TABLE XXXXV

ANALYSIS OF VARIANCE OF IQ SCORES FOR THE VARIABLE ARITHMETIC FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

Source of Variation		df	Sum of Squares	Mean Square	F Ratio	Significance
4th and 6th Grade						
Sex		1	387.818	387.818	3.117	n.s.
Marks		1	4744.797	4744.797	40.951	.01
Race		2	974.705	487.353	3.916	.05
Sex X Marks		1	65.941	65.941	.569	n.s.
Sex X Race		2	407.982	203.991	1.761	n.s.
Marks X Race		2	27.453	13.727	.118	n.s.
Sex X Marks X Race		2	6.280	3.140	.027	n.s.
Error		239	27356.123	114.460		
Marks	(Boys)	1	2251.215	2251.215	17.863	.01
Race	(Boys)	2	1067.659	533.829	3.820	.05
Marks X Race	(Boys)	2	8.222	4.111	.033	n.s.
Error	(Boys)	126	15753.349	125.026		
Marks	(Girls)	1	2666.543	2666.543	26.191	.01
Race	(Girls)	2	307.139	153.569	1.431	n.s.
Marks X Race	(Girls)	2	6.180	3.090	.030	n.s.
Error	(Girls)	113	11602.774	102.679		
6th Grade						
Sex		1	89.542	89.542	.810	n.s.
Marks		1	2126.788	2126.788	20.123	.01
Race		2	912.743	456.372	4.128	.05
Sex X Marks		1	95.214	95.214	.901	n.s.
Sex X Race		2	369.156	369.156	1.746	n.s.
Marks X Race		2	13.165	6.583	.062	n.s.
Sex X Marks X Race		2	58.740	29.370	.279	n.s.
Error		168	17756.199	105.691		
Marks	(Boys)	1	696.717	696.717	5.274	.05
Race	(Boys)	2	781.543	390.772	2.734	n.s.
Marks X Race	(Boys)	2	49.765	24.883	.188	n.s.
Error	(Boys)	89	11624.502	130.612		
Marks	(Girls)	1	1484.881	1484.881	19.373	.01
Race	(Girls)	2	528.909	264.455	3.569	.05
Marks X Race	(Girls)	2	22.607	11.304	.147	n.s.
Error	(Girls)	79	6131.697	77.616		

$F_{.99}$ (1, ∞ df) = 6.63; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.61; $F_{.95}$ (2, ∞ df) = 3.00

TABLE XXXXVI

ANALYSIS OF VARIANCE OF IQ SCORES FOR THE VARIABLE SPELLING FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

Source of Variation		df	Sum of Squares	Mean Square	F Ratio	Significance
4th and 6th Grade						
Sex		1	387.818	387.818	3.117	n.s.
Marks		1	2635.604	2635.604	16.982	.01
Race		2	974.705	487.353	3.916	.05
Sex X Marks		1	14.340	14.340	.092	n.s.
Sex X Race		2	268.867	134.434	.866	n.s.
Marks X Race		2	7.763	3.882	.025	n.s.
Sex X Marks X Race		2	517.277	258.639	1.667	n.s.
Error		239	36842.278	154.151		
Marks	(Boys)	1	2095.457	2095.457	15.149	.01
Race	(Boys)	2	1067.659	533.829	3.820	.05
Marks X Race	(Boys)	2	432.958	216.479	1.565	n.s.
Error	(Boys)	126	17429.288	138.327		
Marks	(Girls)	1	868.149	868.149	5.009	.05
Race	(Girls)	2	307.139	153.569	1.431	n.s.
Marks X Race	(Girls)	2	150.325	75.163	.434	n.s.
Error	(Girls)	113	19412.990	171.796		
6th Grade						
Sex		1	89.542	89.542	.810	n.s.
Marks		1	764.742	764.742	4.932	.05
Race		2	912.743	456.372	4.128	.05
Sex X Marks		1	4.725	4.725	.030	n.s.
Sex X Race		2	241.528	120.764	.779	n.s.
Marks X Race		2	55.937	27.969	.180	n.s.
Sex X Marks X Race		2	111.512	55.766	.360	n.s.
Error		168	25893.963	154.130		
Marks	(Boys)	1	602.120	602.120	4.045	.05
Race	(Boys)	2	781.543	390.772	2.734	n.s.
Marks X Race	(Boys)	2	66.212	33.106	.222	n.s.
Error	(Boys)	89	13249.162	148.866		
Marks	(Girls)	1	304.506	304.506	1.878	n.s.
Race	(Girls)	2	528.909	264.455	3.569	.05
Marks X Race	(Girls)	2	92.555	46.278	.285	n.s.
Error	(Girls)	79	12644.801	160.060		

$F_{.99}$ (1, ∞ df) = 6.63; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.61; $F_{.95}$ (2, ∞ df) = 3.00

TABLE XXXXVII

ANALYSIS OF VARIANCE OF IQ SCORES FOR THE VARIABLE LANGUAGE FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

4th and 6th Grade

Source of Variation		df	Sum of Squares	Mean Square	F Ratio	Significance
Sex		1	387.818	337.818	3.117	n.s.
Marks		1	2501.887	2501.887	16.542	.01
Race		2	974.705	487.353	3.916	.05
Sex X Marks		1	364.523	364.523	2.410	n.s.
Sex X Race		2	311.403	155.702	1.029	n.s.
Marks X Race		2	509.910	259.955	1.689	n.s.
Sex X Marks X Race		2	80.981	40.496	.268	n.s.
Error		239	36298.010	151.874		
Marks	(Boys)	1	504.451	504.451	3.582	n.s.
Race	(Boys)	2	1067.659	533.829	3.820	.05
Marks X Race	(Boys)	2	141.203	70.602	.501	n.s.
Error	(Boys)	126	17746.487	140.845		
Marks	(Girls)	1	2270.149	2270.149	13.950	.01
Race	(Girls)	2	307.139	153.569	1.431	n.s.
Marks X Race	(Girls)	2	630.948	315.474	1.939	n.s.
Error	(Girls)	113	18551.523	164.172		
6th Grade						
Sex		1	89.542	89.542	.810	n.s.
Marks		1	625.954	625.954	4.084	.05
Race		2	912.743	456.372	4.128	.05
Sex X Marks		1	34.216	34.216	.223	n.s.
Sex X Race		2	256.184	128.092	.836	n.s.
Marks X Race		2	13.797	6.899	.045	n.s.
Sex X Marks X Race		2	218.432	109.216	.713	n.s.
Error		168	27101.162	161.316		
Marks	(Boys)	1	244.825	244.825	1.596	n.s.
Race	(Boys)	2	781.543	390.772	2.734	n.s.
Marks X Race	(Boys)	2	67.809	33.905	.221	n.s.
Error	(Boys)	89	13809.713	155.165		
Marks	(Girls)	1	402.868	402.868	2.425	n.s.
Race	(Girls)	2	528.909	264.455	3.569	.05
Marks X Race	(Girls)	2	177.102	88.551	.533	n.s.
Error	(Girls)	79	13291.449	168.246		

$F_{.99}$ (1, ∞ df) = 6.63; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.61; $F_{.95}$ (2, ∞ df) = 3.00

TABLE XXXXVIII

ANALYSIS OF VARIANCE OF ACHIEVEMENT-GROUP SCORES OF HIGH AND LOW ACHIEVING PUPILS FOR THE VARIABLE READING FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

4th and 6th Grade

Source of Variation		df	Sum of Squares	Mean Square	F Ratio	Significance
Sex		1	.051	.051	.236	n.s.
Marks		1	3.096	3.096	14.059	.01
Race		2	.104	.052	.237	n.s.
Sex X Marks		1	.770	.770	3.498	n.s.
Sex X Race		2	.138	.069	.313	n.s.
Marks X Race		2	.999	.500	1.450	n.s.
Sex X Marks X Race		2	.398	.199	.904	n.s.
Error		239	52.627	.220		
Marks	(Boys)	1	.418	.418	1.734	n.s.
Race	(Boys)	2	.198	.099	.410	n.s.
Marks X Race	(Boys)	2	.243	.122	.504	n.s.
Error	(Boys)	126	30.373	.241		
Marks	(Girls)	1	3.249	3.249	16.500	.01
Race	(Girls)	2	.041	.022	.103	n.s.
Marks X Race	(Girls)	2	.813	.407	2.064	n.s.
Error	(Girls)	113	22.254	.196		
6th Grade						
Sex		1	.077	.077	.357	n.s.
Marks		1	2.167	2.167	10.073	.01
Race		2	.195	.098	.454	n.s.
Sex X Marks		1	.535	.535	2.487	n.s.
Sex X Race		2	.364	.182	.846	n.s.
Marks X Race		2	.585	.293	1.360	n.s.
Sex X Marks X Race		2	.139	.069	.324	n.s.
Error		168	36.148	.215		
Marks	(Boys)	1	.294	.294	1.247	n.s.
Race	(Boys)	2	.568	.284	1.209	n.s.
Marks X Race	(Boys)	2	.119	.060	.253	n.s.
Error	(Boys)	89	20.968	.235		
Marks	(Girls)	1	2.274	2.274	11.850	.01
Race	(Girls)	2	.017	.009	.045	n.s.
Marks X Race	(Girls)	2	.595	.298	1.549	n.s.
Error	(Girls)	79	15.180	.192		

$F_{.99}$ (1, ∞ df) = 6.63; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.61; $F_{.95}$ (2, ∞ df) = 3.00

TABLE XXXXIX

ANALYSIS OF VARIANCE OF ACHIEVEMENT-GROUP SCORES OF HIGH AND LOW ACHIEVING PUPILS FOR THE VARIABLE ARITHMETIC FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	Significance
4th and 6th Grade					
Sex	1	.021	.021	.085	n.s.
Marks	1	1.895	1.895	7.590	.01
Race	2	.399	.200	.798	n.s.
Sex X Marks	1	.071	.071	.283	n.s.
Sex X Race	2	.053	.027	.106	n.s.
Marks X Race	2	.074	.037	.148	n.s.
Sex X Marks X Race	2	.101	.051	.202	n.s.
Error	239	58.638	.245		
Marks (Boys)	1	.772	.772	3.029	n.s.
Race (Boys)	2	1.093	.547	.184	n.s.
Marks X Race (Boys)	2	1.034	.517	.066	n.s.
Error (Boys)	126	30.861	.244		
Marks (Girls)	1	.952	.952	3.906	.05
Race (Girls)	2	.370	.185	.761	n.s.
Marks X Race (Girls)	2	.259	.130	.531	n.s.
Error (Girls)	113	27.777	.245		
6th Grade					
Sex	1	.139	.139	.568	n.s.
Marks	1	1.186	1.186	4.842	.05
Race	2	1.130	.565	2.306	n.s.
Sex X Marks	1	.005	.005	.017	n.s.
Sex X Race	2	.073	.037	.148	n.s.
Marks X Race	2	.448	.224	.914	n.s.
Sex X Marks X Race	2	.150	.075	.306	n.s.
Error	168	41.135	.244		
Marks (Boys)	1	.552	.552	2.181	n.s.
Race (Boys)	2	.488	.244	.965	n.s.
Marks X Race (Boys)	2	.083	.042	.163	n.s.
Error (Boys)	89	22.274	.250		
Marks (Girls)	1	.634	.634	2.688	n.s.
Race (Girls)	2	.683	.342	1.447	n.s.
Marks X Race (Girls)	2	.486	.243	1.030	n.s.
Error (Girls)	79	18.861	.238		

$F_{.99}$ (1, ∞ df) = 6.63; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.61; $F_{.95}$ (2, ∞ df) = 3.00

TABLE L

ANALYSIS OF VARIANCE OF ACHIEVEMENT-GROUP SCORES OF HIGH AND LOW ACHIEVING PUPILS FOR THE VARIABLE SPELLING FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	Significance
4th and 6th Grade					
Sex	1	.010	.010	.044	n.s.
Marks	1	4.329	2.165	19.175	.01
Race	2	.342	.171	.756	n.s.
Sex X Marks	1	.130	.130	.577	n.s.
Sex X Race	2	.622	.311	1.378	n.s.
Marks X Race	2	.398	.199	1.545	n.s.
Sex X Marks X Race	2	.563	.282	1.245	n.s.
Error	239	53.717	.225		
Marks (Boys)	1	4.119	4.119	18.965	.01
Race (Boys)	2	.377	.199	.868	n.s.
Marks X Race (Boys)	2	1.390	.695	3.199	.05
Error (Boys)	126	27.368	.217		
Marks (Girls)	1	1.147	1.147	4.873	.05
Race (Girls)	2	.542	.271	1.151	n.s.
Marks X Race (Girls)	2	.188	.094	.399	n.s.
Error (Girls)	113	26.349	.233		
6th Grade					
Sex	1	.104	.104	.438	n.s.
Marks	1	.759	.759	3.212	n.s.
Race	2	.396	.198	.839	n.s.
Sex X Marks	1	.846	.846	3.580	n.s.
Sex X Race	2	.268	.134	.566	n.s.
Marks X Race	2	.117	.059	.247	n.s.
Sex X Marks X Race	2	1.014	.507	2.147	n.s.
Error	168	39.449	.234		
Marks (Boys)	1	2.974	2.974	13.185	.01
Race (Boys)	2	.053	.027	.118	n.s.
Marks X Race (Boys)	2	.498	.249	1.105	n.s.
Error (Boys)	89	20.073	.225		
Marks (Girls)	1	.001	.001	.003	n.s.
Race (Girls)	2	.451	.226	.909	n.s.
Marks X Race (Girls)	2	.584	.292	1.175	n.s.
Error (Girls)	79	19.376	.245		

$F_{.99}$ (1, ∞ df) = 6.63; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.61; $F_{.95}$ (2, ∞ df) = 3.00

TABLE LI

ANALYSIS OF VARIANCE OF ACHIEVEMENT-GROUP SCORES OF HIGH AND LOW ACHIEVING PUPILS FOR THE VARIABLE LANGUAGE FOR FOURTH AND SIXTH GRADES COMBINED AND SIXTH GRADE ALONE CLASSIFIED ACCORDING TO SEX, TEACHER MARKS, AND RACE

4th and 6th Grade

Source of Variation	df	Sum of Squares	Mean Square	F Ratio	Significance
Sex	1	.148	.148	.646	n.s.
Marks	1	3.810	3.810	16.665	.01
Race	2	.040	.020	.088	n.s.
Sex X Marks	1	.481	.481	2.105	n.s.
Sex X Race	2	.027	.014	.060	n.s.
Marks X Race	2	.772	.386	1.688	n.s.
Sex X Marks X Race	2	.146	.073	.319	n.s.
Error	239	54.874	.229		
Marks (Boys)	1	.835	.835	3.395	n.s.
Race (Boys)	2	.050	.025	.102	n.s.
Marks X Race (Boys)	2	.288	.144	.586	n.s.
Error (Boys)	126	30.983	.245		
Marks (Girls)	1	3.327	3.327	15.876	.01
Race (Girls)	2	.011	.006	.054	n.s.
Marks X Race (Girls)	2	.544	.272	1.299	n.s.
Error (Girls)	113	23.891	.211		
6th Grade					
Sex	1	.195	.195	.891	n.s.
Marks	1	.511	.511	2.336	n.s.
Race	2	1.449	.725	3.316	.05
Sex X Marks	1	.231	.231	1,056	n.s.
Sex X Race	2	.012	.006	.027	n.s.
Marks X Race	2	1.532	.716	3.508	.05
Sex X Marks X Race	2	.257	.129	.589	n.s.
Error	168	37.120	.221		
Marks (Boys)	1	.043	.043	.180	n.s.
Race (Boys)	2	1.032	.516	2.157	n.s.
Marks X Race (Boys)	2	.984	.492	2.058	n.s.
Error (Boys)	89	21.526	.241		
Marks (Girls)	1	.604	.604	3.096	n.s.
Race (Girls)	2	.519	.260	1.330	n.s.
Marks X Race (Girls)	2	1.125	.563	2.886	n.s.
Error (Girls)	79	15.594	.197		

$F_{.99}$ (1, ∞ df) = 6.63; $F_{.95}$ (1, ∞ df) = 3.84

$F_{.99}$ (2, ∞ df) = 4.61; $F_{.95}$ (2, ∞ df) = 3.00